

SHARP

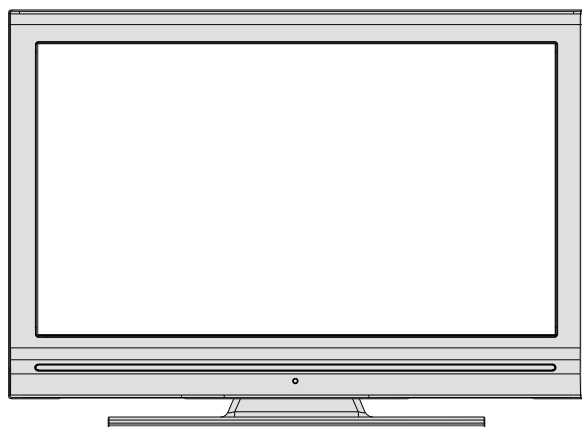
SERVICE MANUAL

Issued: 16 June 2011

LCD COLOUR TELEVISION

DVB-T / DVB-C (HDTV), PAL B/G, I / SECAM B/G, D/K, L/L' SYSTEM COLOUR TELEVISION

17MB60 CHASSIS



MODELS

LC-32SH130E

LC-32SH130K

LC-32SH340E

In the interests of user safety (required by safety regulations in some countries) the set should be re-stored to its original condition and only parts identical to those specified should be used.

CONTENTS

TABLE OF CONTENTS.....	2
ELECTRICAL SPECIFICATIONS	7
IMPORTANT SERVICE SAFETY PRECAUTIONS.....	8
OPERATION MANUAL	11
DIMENSIONS	17
INTRODUCTION.....	18
CIRCUIT DESCRIPTIONS	21
SERVICE MENU SETTINGS	66
SOFTWARE UPDATE	71
HOTEL TV MODE.....	72
TROUBLESHOOTING.....	76
SCHEMATIC DIAGRAMS.....	85
PRINTED WIRING BOARD.....	95
REPLACEMENT PARTS LIST	97

TABLE OF CONTENTS

i	SPECIFICATIONS.....	7
ii	IMPORTANT SERVICE SAFETY PRECAUTIONS	8
iii	OPERATION MANUAL	11
iv	DIMENSIONS	17
1.	INTRODUCTION.....	18
1.1.	General Block Diagram	19
1.2.	MB60 Placement of Blocks	20
2.	TUNER(TU102)	21
2.1.	General description of Samsung DTOS403LH122X:	22
2.2.	Features of DTOS403LH122X:	22
2.3.	Pinning:.....	23
3.	SAW FILTER - Audio - Epcos K9656M(Z101).....	24
3.1.	Standard.....	24
3.2.	Features	24
3.3.	Pin configuration.....	24
3.4.	Frequency response	25
4.	SAW FILTER - Video - Epcos K3958M(Z102).....	26
4.1.	Standard.....	26
4.2.	Features	26
4.3.	Pin configuration:	26
4.4.	Frequency response	27
5.	AUDIO AMPLIFIER STAGE WITH AZAD2102(U163, U164)	28
5.1.	General Description	28
5.2.	Features	28
5.3.	Absolute Ratings	29
5.3.1.	Electrical Characteristics	29
5.3.2.	Operating Specifications	30
5.4.	Pinning.....	31
6.	AUDIO AMPLIFIER STAGE WITH TPA3113(U168).....	32
6.1.	General Description	32
6.2.	Features	32

6.3.	Absolute Ratings	32
6.3.1.	Electrical Characteristics	32
6.3.2.	Operating Specifications	33
6.4.	Pinning.....	33
7.	POWER STAGE	34
7.1.	Short CCT Protection Circuit	36
7.2.	Power Management.....	37
8.	MICROCONTROLLER - MSTAR(U157)	39
8.1.	General Description	39
8.2.	General Features.....	39
8.3.	MSTAR Block Diagram	44
8.4.	Reset Circuit	44
9.	CI INTERFACE.....	45
9.1	Block Diagram	45
9.2	CI Interface Power Switch	45
10.	USB INTERFACE.....	46
11.	DDR2 SDRAM 8M × 4 BANKS × 16 BIT (W9751G6JB) (U154, U155)	47
11.1.	General Description	47
11.2.	Features	47
11.3.	Electrical Characteristics	47
11.4.	Pinning.....	48
12.	SCALER AND LVDS SOCKETS	50
12.1.	LVDS sockets Block Diagram	50
12.2.	Panel Supply Switch Circuit	50
13.	NAND FLASH MEMORY - MX25L1005 (U158).....	52
13.1.	General Description	52
13.2.	Features	52
13.3.	Absolute Maximum Ratings	52
13.4.	Pinning.....	52

14.	NAND FLASH MEMORY - NAND512XXA2C (U162)	53
14.1.	General Description	53
14.2.	Features	53
14.3.	Pinning.....	54
15.	USB2.0 to Fast Ethernet - ASIX AX88X72A (U171)	55
15.1.	General Description	55
15.2.	Features	55
15.3.	Block Diagram	56
15.4.	Pinning.....	56
16.	LM1117(U175, U180, U181).....	57
16.1.	General Description	57
16.2.	Features	57
16.3.	Applications.....	57
16.4.	Absolute Maximum Ratings	57
16.5.	Pinning.....	57
17.	MP2012 (U176)	58
17.1.	General Description	58
17.2.	Features	58
17.3.	Pinning.....	58
18.	RTA8283A (U23, U173)	59
18.1.	General Description	59
18.2.	Features	59
18.3.	Pinning.....	60
19.	MP1583 (U174)	61
19.1.	General Description	61
19.2.	Features	61
19.3.	Pinning.....	61
20.	FDC642	62
20.1.	General Description	62

20.2.	Features	62
20.3.	Pinning.....	62
21.	FDC604P.....	63
21.1.	General Description	63
21.2.	Features	63
21.3.	Pinning.....	63
22.	CONNECTORS	64
22.1.	SCART (SC1).....	64
22.2.	HDMI (CN707,CN708)	64
22.3.	VGA (CN132)	65
23.	SERVICE MENU SETTINGS	66
23.1.	Video Settings	67
23.2.	Audio Settings	67
23.3.	Options	68
23.4.	Tuning Settings.....	69
23.5.	Source Settings	69
23.6.	Diagnostic	70
23.7.	USB Operations.....	70
24.	SOFTWARE UPDATE.....	71
25.	HOTEL TV MODE.....	72
26.	TROUBLESHOOTING	76
26.1.	No Backlight Problem.....	76
26.2.	CI Module Problem.....	78
26.3.	Led Blinking Problem	79
26.4.	IR Problem	80
26.5.	Keypad Touchpad Problems	81
26.6.	USB Problems	82
26.7.	No Sound Problem	83

26.8. No Sound Problem at Headphone 83

26.9. Standby On/Off Problem..... 83

26.10. No Signal Problem 84

27. SCHEMATIC DIAGRAMS..... 85

28. PRINTED WIRING BOARD..... 95

29. REPLACEMENT PARTS LIST..... 97

ELECTRICAL SPECIFICATIONS

Specifications

TV BROADCASTING

PAL/SECAM B/G D/K K' I/I' L/L'

RECEIVING CHANNELS

VHF (BAND I/III)

UHF (BAND U)

HYPERBAND

NUMBER OF PRESET CHANNELS

1000

CHANNEL INDICATOR

On Screen Display

RF AERIAL INPUT

75 Ohm (unbalanced)

OPERATING VOLTAGE

220-240V AC, 50Hz.

AUDIO

German + Nicam Stereo

AUDIO OUTPUT POWER (W_{RMS}) (10% THD)

2 x 6

POWER CONSUMPTION (W)

150 W (max)

< 0,5 W (Standby)

PANEL

16:9 display, 32" (80 cm) Screen Size

DIMENSIONS (mm)

DxLxH (With foot): 212 x 776 x 567

Weight (Kg): 12,30

DxLxH (Without foot): 94 x 776 x 524

Weight (Kg): 11,60

Digital Reception (DVB-C)

Only for LC32SH130E - LC-32SH340E

Transmission Standards:

DVB-C, MPEG2, DVB-C, MPEG4

i. DEMODULATION

-Symbolrate: 4.0 Msymbols/s to 7.2 Msymbols/s

- Modulation: 16-QAM, 32-QAM, 64-QAM, 128-QAM and 256-QAM

ii. VIDEO

- All MPEG2 MP@ML formats with up-conversion and filtering to CCIR601 format.

-CVBS analogue output

iii. AUDIO

-All MPEG1 Layer 1 and 2 modes

-Sampling frequencies supported are 32, 44.1 & 48 kHz

Digital Reception (DVB-T)	MHEG-5 ENGINE compliant with ISO/IEC 13522-5 UK engine Profile 1	for UK
	Object carousel support compliant with ISO/IEC 135818-6 and UK DTT profile	
	Frequency range: 474-850 MHz for UK models	
	170-862 MHz for EU models	
	Transmission standard: DVB-T, MPEG-2, MPEG-4	
	Demodulation: COFDM with 2K/8K FFT mode	
	FEC: all DVB modes	
	Video: MP@ML, PAL, 4:3/16:9	
	Audio: MPEG Layer I&II 32/44, 148kHz.	

Cautions regarding use in high and low temperature environments

- When the unit is used in a low temperature space (e.g. room, office), the picture may leave trails or appear slightly delayed. This is not a malfunction, and the unit will recover when the temperature returns to normal.
- Do not leave the unit in a hot or cold location. Also, do not leave the unit in a location exposed to direct sunlight or near a heater, as this may cause the cabinet to deform and the LCD panel to malfunction. Storage temperature: -20°C to +60°C.

- As a part of our policy of continuous improvement, SHARP reserves the right to make design and specification changes for product improvement without prior notice. The performance specification figures indicated are nominal values of production units. There may be some deviations from these values in individual units.

IMPORTANT SERVICE SAFETY PRECAUTION

Service work should be performed only by qualified service technicians who are thoroughly familiar with all safety checks and the servicing guidelines which follow:

WARNING

1. For continued safety, no modification of any circuit should be attempted.
2. Disconnect AC power before servicing.

CAUTION: FOR CONTINUED PROTECTION AGAINST A RISK OF FIRE REPLACE ONLY WITH SAME TYPE
F800, F801 (T 3.15A L250V)

BEFORE RETURNING THE RECEIVER (Fire & Shock Hazard)

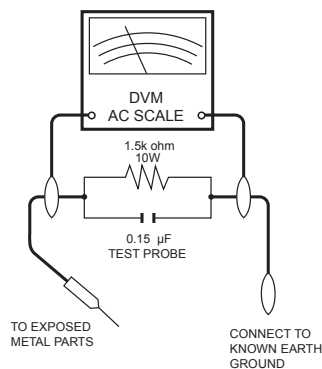
Before returning the receiver to the user, perform the following safety checks:

1. Inspect all lead dress to make certain that leads are not pinched, and check that hardware is not lodged between the chassis and other metal parts in the receiver.
2. Inspect all protective devices such as non-metallic control knobs, insulation materials, cabinet backs, adjustment and compartment covers or shields, isolation resistor-capacitor networks, mechanical insulators, etc.
3. To be sure that no shock hazard exists, check for leakage current in the following manner.

- Plug the AC cord directly into a 220~240 volt AC outlet. (Do not use an isolation transformer for this test).
- Using two clip leads, connect a 1.5k ohm, 10 watt resistor paralleled by a 0.15 μ F capacitor in series with all exposed metal cabinet parts and a known earth ground, such as electrical conduit or electrical ground connected to an earth ground.
 - A true RMS reading multimeter should be used for this test, especially where the equipment uses a switch mode power supply which may result in very non-sinusoidal leakage current.
 - Connect the resistor connection to all exposed metal parts having a return to the chassis (antenna, metal cabinet, screw heads, knobs and control shafts, escutcheon, etc.) and measure the AC voltage drop across the resistor.

All checks must be repeated with the AC cord plug connection reversed. (If necessary, a nonpolarized adaptor plug must be used only for the purpose of completing these checks.)

Any reading of 1.05V peak (this corresponds to 0.7 mA. peak AC.) or more is excessive and indicates a potential shock hazard which must be corrected before returning the monitor to the owner.



SAFETY NOTICE

Many electrical and mechanical parts in LCD television have special safety-related characteristics.

These characteristics are often not evident from visual inspection, nor can protection afforded by them be necessarily increased by using replacement components rated for higher voltage, wattage, etc.

Replacement parts which have these special safety characteristics are identified in this manual; electrical components having such features are identified by “⚠”.

For continued protection, replacement parts must be identical to those used in the original circuit.

The use of a substitute replacement parts which do not have the same safety characteristics as the factory recommended replacement parts shown in this service manual, may create shock, fire or other hazards.

PRECAUTIONS FOR USING LEAD-FREE SOLDER

1 Employing lead-free solder

"ALL PWB" of this model employs lead-free solder. The LF symbol indicates lead-free solder, and is attached on the PWBs and service manuals. The alphabetical character following LF shows the type of lead-free solder.

Example:

LFa
Sn-Ag-Cu

Indicates lead-free solder of tin, silver and copper.

LFn
Sn-Ag-Ni

Indicates lead-free solder of tin, silver and nickel.

2 Using lead-free wire solder

When fixing the PWB soldered with the lead-free solder, apply lead-free wire solder. Repairing with conventional lead wire solder may cause damage or accident due to cracks.

As the melting point of lead-free solder (Sn-Ag-Cu) is higher than the lead wire solder by 40°C, we recommend you to use a dedicated soldering bit, if you are not familiar with how to obtain lead-free wire solder or soldering bit, contact our service station or service branch in your area.

3 Soldering

As the melting point of lead-free solder (Sn-Ag-Cu) is about 220°C which is higher than the conventional lead solder by 40°C, and as it has poor solder wettability, you may be apt to keep the soldering bit in contact with the PWB for extended period of time. However, Since the land may be peeled off or the maximum heat-resistance temperature of parts may be exceeded, remove the bit from the PWB as soon as you confirm the steady soldering condition.

Lead-free solder contains more tin, and the end of the soldering bit may be easily corroded. Make sure to turn on and off the power of the bit as required.

If a different type of solder stays on the tip of the soldering bit, it is alloyed with lead-free solder. Clean the bit after every use of it.

When the tip of the soldering bit is blackened during use, file it with steel wool or fine sandpaper.

Be careful when replacing parts with polarity indication on the PWB silk.

Lead-free wire solder for servicing.

Part No.	★	Description	Code
ZHNDai123250E	J	φ0.3mm 250g(1roll)	BL
ZHNDai126500E	J	φ0.6mm 500g(1roll)	BK
ZHNDai12801KE	J	φ1.0mm 1kg(1roll)	BM

END OF LIFE DISPOSAL



Attention: Your product is marked with this symbol. It means that used electrical and electronic products should not be mixed with general household waste. There is a separate collection system for these products.

A. Information on Disposal for Users (private households)

1. In the European Union

Attention: If you want to dispose of this equipment, please do not use the ordinary dust bin!

Used electrical and electronic equipment must be treated separately and in accordance with legislation that requires proper treatment, recovery and recycling of used electrical and electronic equipment. Following the implementation by member states, private households within the EU states may return their used electrical and electronic equipment to designated collection facilities free of charge*. In some countries* your local retailer may also take back your old product free of charge if you purchase a similar new one. *) Please contact your local authority for further details.

If your used electrical or electronic equipment has batteries or accumulators, please dispose of these separately beforehand according to local requirements.

By disposing of this product correctly you will help ensure that the waste undergoes the necessary treatment, recovery and recycling and thus prevent potential negative effects on the environment and human health which could otherwise arise due to inappropriate waste handling.

2. In other Countries outside the EU

If you wish to discard this product, please contact your local authorities and ask for the correct method of disposal.

For Switzerland: Used electrical or electronic equipment can be returned free of charge to the dealer, even if you don't purchase a new product. Further collection facilities are listed on the homepage of www.swico.ch or www.sens.ch.

B. Information on Disposal for Business Users

1. In the European Union

If the product is used for business purposes and you want to discard it:

Please contact your SHARP dealer who will inform you about the take-back of the product. You might be charged for the costs arising from take-back and recycling. Small products (and small amounts) might be taken back by your local collection facilities.

For Spain: Please contact the established collection system or your local authority for take-back of your used products.

2. In other Countries outside the EU

If you wish to discard of this product, please contact your local authorities and ask for the correct method of disposal.



The battery supplied with this product contains traces of Lead.

For EU: The crossed-out wheeled bin implies that used batteries should not be put to the general household waste! There is a separate collection system for used batteries, to allow proper treatment and recycling in accordance with legislation. Please contact your local authority for details on the collection and recycling schemes.

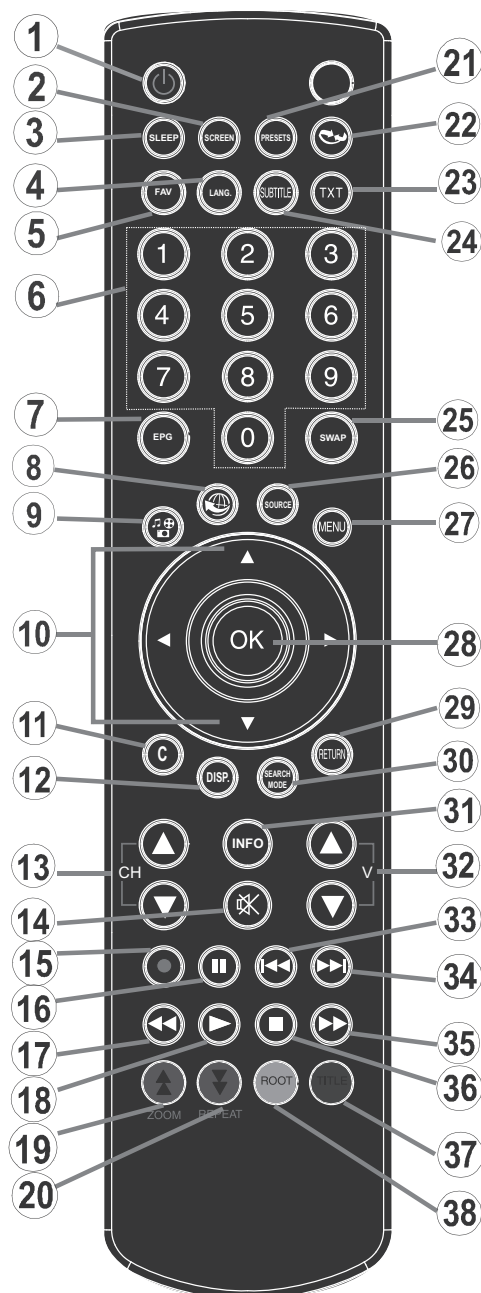
For Switzerland: The used battery is to be returned to the selling point.

For other non-EU countries: Please contact your local authority for correct method of disposal of the used battery.

OPERATION MANUAL

Remote Control Buttons

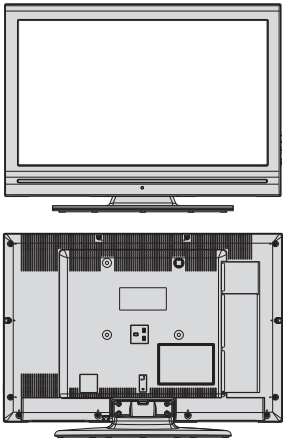
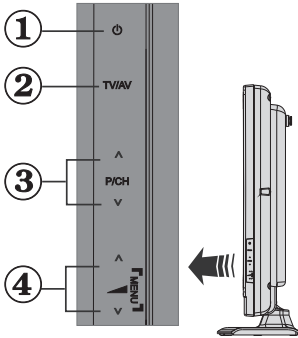
1. Standby
2. Image size / Zooms videos (in Media Browser video mode)
3. Sleep Timer
4. Mono / Stereo - Dual I-II / Current Language (*) (in DVB channels)
5. Favourite Mode Selection (in DVB channels)
6. Numeric buttons
7. Electronic programme guide (in DVB channels)
8. No function
9. Media Browser
10. Navigation buttons (Up/Down/Left/Right)
11. No function
12. Recordings Library
13. Programme Down / Page up - Programme Up / Page down
14. Mute
15. Programme recording
16. Pause (in Media Browser mode) / Timeshift recording
17. Rapid reverse (in Media Browser mode)
18. Play (in Media Browser mode)
19. Red button
20. Green button / List Schedule (in EPG) / Tag / Untag All (in favourite list) / Play-Slideshow (in Media Browser) / Loop-Shuffle (in Media Browser)
21. Picture mode selection / Changes picture mode (in Media Browser video mode)
22. No function
23. Teletext / Mix (in TXT mode)
24. Subtitle on-off (in DVB channels)
25. Previous programme
26. AV / Source selection
27. Menu on-off
28. Okay (Confirm) / Hold (in TXT mode) / Edit Channel List
29. Exit / Return / Index page (in TXT mode)
30. No function
31. Info / Reveal (in TXT mode)
32. Volume Up / Down
33. No function
34. No function
35. Rapid advance (in Media Browser mode)



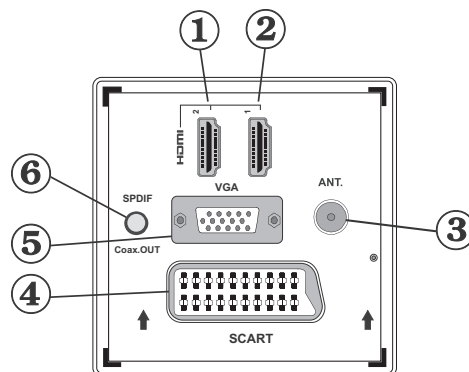
36. Stop (in Media Browser mode)
37. Blue button / Edit Channel List / Filter (In Favourite List&EPG)
38. Yellow button / Timeline Schedule (in EPG)

Operation Manual (Continued)

LCD TV and Operating Buttons

FRONT and REAR VIEW	Control buttons VIEW	Control Buttons
		1. Standby/On button 2. TV/AV button 3. Programme Up/Down buttons 4. Volume Up/Down buttons Note: Press “←” and “→” buttons at the same time to view main menu.

Viewing the Connections - Back Connectors

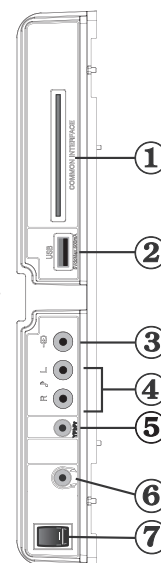


- HDMI 2: HDMI Input**
- HDMI 1: HDMI Input**
HDMI Inputs are for connecting a device that has an **HDMI** socket. Your LCD TV is capable of displaying High Definition pictures from devices such as a High Definition Satellite Receiver or DVD Player. These devices must be connected via the HDMI sockets or Component Socket. These sockets can accept either 720p or 1080i signals. No sound connection is needed for an HDMI to HDMI connection.
- RF Input** connects to an aerial antenna system or a cable.
Note that if you use a decoder or a media recorder, you should connect the aerial cable through the device to the television with an appropriate antenna cable, as shown in the illustration in the following pages.
- SCART** input or output for external devices. Connect the SCART cable between SCART socket on TV and SCART socket on your external device (such as a decoder, a VCR or a DVD player).
Note: If an external device is connected via the SCART socket, the TV will automatically switch to AV mode.
Note: S-VHS signal is supported via the scart socket.
Note: When receiving DTV channels (Mpeg4 H.264) or while in Media Browser mode, output will not be available via the scart socket.
- PC Input** is for connecting a personal computer to the TV set.
Connect the PC cable between the **PC INPUT** on the TV and the PC output on your PC.
- SPDIF Coaxial Out** outputs digital audio signals of the currently watched source.
Use an **SPDIF coaxial cable** to transfer audio signals to a device that has SPDIF input

Operation Manual (Continued)

Viewing the Connections - Side Connectors

1. **CI Slot** is used for inserting a CI card. A CI card allows you to view all the channels that you subscribe to. For more information, see "Conditional Access" section.
2. **USB Inputs.**
Note that programme recording feature is available via these USB inputs. You can connect external hard disk drives to this input.
3. **Video Input** is used for connecting video signals of external devices. Connect the video cable between the VIDEO IN socket on the TV and the VIDEO OUT jack on your device.
4. **Audio Inputs** are used for connecting audio signals of external devices. Connect the audio cable between the AUDIO INPUTS on the TV and the AUDIO OUTPUT jacks on your device.
Note: If you connect a device to the TV via the VIDEO INPUT, you should also connect your device with an audio cable to the AUDIO INPUTS of the TV to enable audio.
5. **Component Video Input (YPbPr)** is used for connecting component video. You can connect the component video and audio sockets with a device that has component output. To do this, you must use the supplied component video connection cable for enabling connection. First, plug single jack of the cable to the TV's YPbPr socket (side). Afterwards, insert your component cable's (not supplied) connectors into the plural part of the Component video connection cable. Colours of the connected jacks should match.
6. **Headphone** jack is used for connecting an external headphone to the system. Connect to the HEADPHONE jack to listen to the TV from headphones (optional).
7. **Power** switch is used for turning the TV on or off.



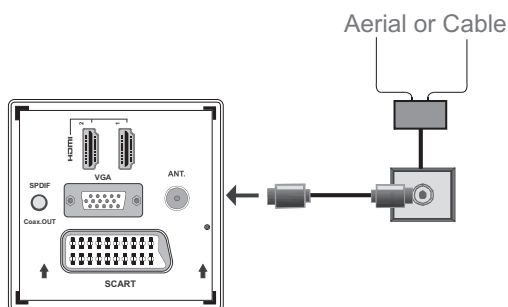
Power Connection

IMPORTANT: The TV set is designed to operate on 220-240V AC, 50Hz.

- After unpacking, allow the TV set to reach the ambient room temperature before you connect the set to the mains. Plug the power cable to the mains socket outlet.

Aerial Connection

- Connect the aerial ,cable TV plug to the AERIAL INPUT socket located at the rear of the TV.



Operation Manual (Continued)

Using USB Inputs

USB Connection

- You can connect a USB hard disk drive or USB memory stick to your TV by using the USB inputs of the TV. This feature allows you to play files stored in a USB drive or record programmes.
- 2.5" and 3.5" inch (hdd with external power supply) external hard disk drives are supported.
- To record a programme, you should first connect a USB disk to your TV while the TV is switched off. You should then switch on the TV to enable recording feature. Otherwise, recording feature will not be available.

IMPORTANT !

- You may back up your files before making any connections to the TV set in order to avoid any possible data loss. Note that manufacturer will not be responsible for any file damage or dataloss.
- It is possible that certain types of USB devices (e.g. MP3 Players) or USB hard disk drives/memory sticks may not be compatible with this TV.

IMPORTANT: The TV supports only FAT32 disk formatting. NTFS format is not supported. If you connect a USB disk with NTFS format, the TV will ask you to format the content. See the section, "Format Disk" in the following pages for more information on disk formatting.

Note that ALL the data stored on the USB disk will be lost and then the disk format will be converted to FAT32 in such a case.

USB Disk Connection

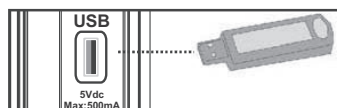
- Plug your USB device to the USB input of the TV.

Note: Plug or unplug your USB disk while the TV is switched off.

Note: If you are going to connect a USB hard disk drive to the TV set, USB connection cable used between the disk drive and the TV should have a USB logo and should be as short as possible.

Note: While formatting a USB hard disk that has 1TB (Tera Byte) or more file capacity, you can experience problems with the formatting process. In such a case, you should format the disk with your personal computer and the formatted disk type should be FAT32.

SIDE VIEW USB MEMORY



CAUTION !

- Quickly plugging and unplugging USB devices, is a very hazardous operation. Especially, do not repeatedly quickly plug and unplug the drive. This may cause physical damage to the USB player and especially the USB device itself.
- Do not pull out USB module while playing or recording a file.

Programme Recording

To record a programme, you should first connect a USB disk to your TV while the TV is switched off. You should then switch on the TV to enable recording feature.

IMPORTANT: When using a new USB hard disk drive, it is recommended that you first format the disk using your TV's "Format Disk" option.

- To use the recording function a USB 2.0 certified device of at least 1GB should be used, If the connected USB device is not USB 2.0 an error message will be displayed.
- Recorded programmes are saved into the connected USB disk in .TS format (MPEG-2 transport stream). If desirable, you can back up / copy these saved recordings into a personal computer.

Note: It is possible that recorded broadcasts in .TS format may not be supported by your media playback software. In such a case, you should install an appropriate media playback software to your computer.

- An hour of the recordings stored occupies approximately 2 GB of space.
- For more information on recording programmes, see sections "Instant Recording", "Timeshifting", "Electronic Programme Guide", "Recordings Library" or "Recording Timers" in the following parts.
- Recorded programmes are split into 1GB partitions. Names of the stored recordings' last three digits indicates this: Such as 4801-000.ts , 4801-001.ts.
- Recorded programmes are stored in the following directory of the connected USB disk: \DVR\RECS. All recordings are indicated with a number (such as 4801-000.ts). A text (txt) file is created for each recording. This text file includes information such as broadcaster, programme, and recording time.

- If the writing speed of the connected USB disk is not sufficient, recording may fail and timeshifting feature may not be available.
- Recordings of HD programmes can occupy bigger size on the USB disk depending on the broadcast's resolution. For this reason it is recommended to use USB hard disk drives for recording HD programmes.

Operation Manual (Continued)

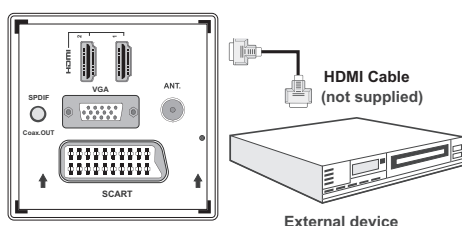
- Do not plug out the USB/HDD during the recording. This may harm the connected USB/HDD.
- Only two partitions on a HDD unit can be supported.
- Some stream packets may not be recorded because of signal problems, so sometimes video may freeze during playback.
- Record, Play, Pause, Display (for PlayListDialog) keys could not be used when teletext is ON. If a recording starts from timer when teletext is ON, teletext is automatically turned off. Also teletext usage is disabled when there is ongoing recording or playback.

Connecting to a DVD Player via HDMI

Please refer to your DVD player's instruction book for additional information. Power off both the TV and the device before making any connections.

Note: Not all cables shown in the illustration are supplied.

- If your DVD player has an **HDMI** socket, you can connect via **HDMI** for better video and audio quality.



- When you connect to DVD player as illustrated above, switch to the connected **HDMI** source. See, **Input Selection** section for more information on changing sources.

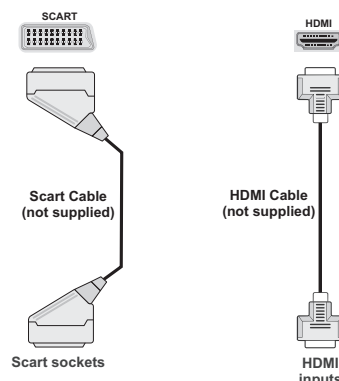
Connecting to a DVD Player via Component Sockets (YPbPr) or Scart Cable

If you want to connect a DVD player to your LCD TV, you can use connectors of the TV set. DVD players may have different connectors. Please refer to your DVD player's instruction book for additional information. Power off both the TV and the device before making any connections.

Note: Cables shown in the illustration are not supplied.

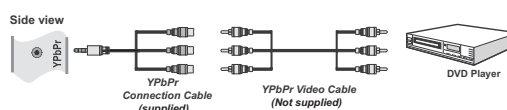
- If your DVD player has an HDMI socket, you can connect via HDMI. When you connect to DVD player as illustrated below, switch to HDMI source. See, "Input Selection" section.
- You may also connect through the scart socket. Use a SCART cable as shown below.

Note: These two methods of connection perform the same function but in different levels of quality. It is not necessary to connect by all three methods.



DVD Player

- Some DVD players are connected through **COMPONENT SOCKETS (YPbPr)**. In this case, you must use the supplied Component video connection cable for enabling connection. First, plug single jack of the cable to the TV's YPbPr socket (side). Afterwards, insert your component cable's (not supplied) connectors into the socket part of the Component video connection cable (see illustration below). Colours of the connected jacks should match.
- To enable audio connection, use the **VGA/Component Audio cable**. First, plug single jack of the cable to the TV. Afterwards, insert your DVD player's audio cable's connectors into the socket part of the **VGA/Component audio connection cable** (see illustration below). Colours of the connected jacks should match.

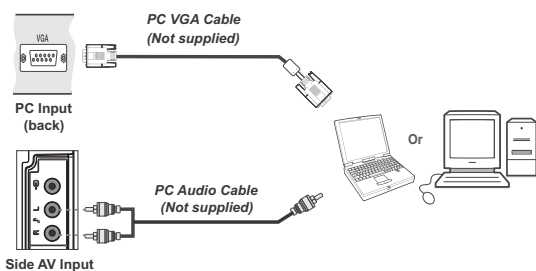


- When the connection is made, switch to **YPbPr** source. See, **Input selection** section. **Note:** To connect YPb Pr device, you should use supplied component (YPbPr) connection cable.

Operation Manual (Continued)

Connecting the LCD TV to a PC

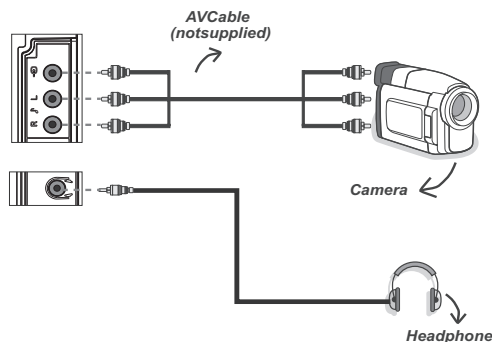
For displaying your computer's screen image on your LCD TV, you can connect your computer to the TV set. Power off both computer and display before making any connections. Use 15-pin D-sub display cable to connect a PC to the LCD TV. When the connection is made, switch to PC source. See "Input selection" section. Set the resolution that suits your viewing requirements. Resolution information can be found in the appendix parts.



Using Side AV Connectors

You can connect a range of optional equipment to your LCD TV.

- For connecting a camcorder, connect to the VIDEO IN socket and the AUDIO SOCKETS. For selecting the related source, see the section "Input selection" in the following parts.
- To listen the TV sound from headphones, connect to the HEADPHONE jack of the TV.



Remote Control Handset

Inserting Batteries

- Remove the battery cover located on the back of the handset by gently pulling backwards from the indicated part.
- Insert two **AAA/R3** or equivalent type batteries inside. Observe the correct polarity (+/-) when inserting batteries and replace the battery cover.



Note: Remove the battery from remote control handset when it is not to be used for a long period. Otherwise it can be damaged due to any leakage of batteries. Remote range is approximately 7m/23ft.

Switching On/Off

To Switch the TV On

Connect the power cord to the 220-240V AC 50 Hz.

- Switch the "I" button on the bottom right hand side under the screen to position "I" so the TV will switch to standby mode. Then the standby LED lights up.
- To switch on the TV from standby mode either:
 - Press the "I" button, CH▲ / CH▼ or a numeric button on the remote control.
 - Press the "I" or +/- button on the TV.
- The TV will then switch on.

Note: If you switch on your TV via CH▲ / CH▼ buttons on the remote control or on the TV set, the programme that you were watching last will be reselected.

By either method the TV will switch on.

To Switch the TV to Standby

To switch the TV to low power stand by press the "I" button on the remote control or right hand side of the TV.

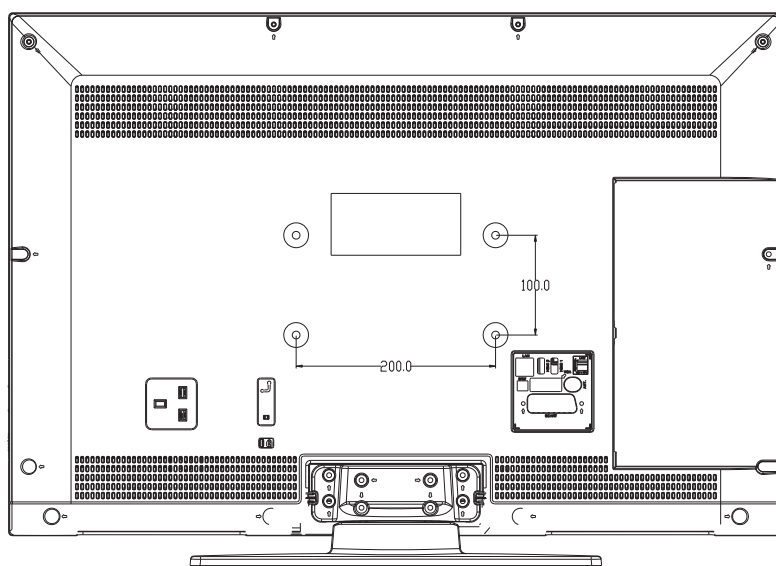
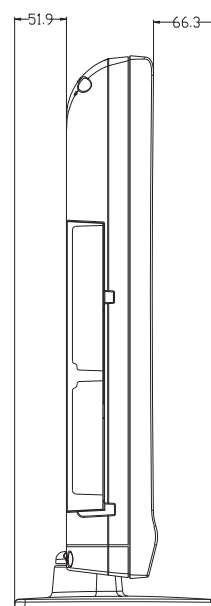
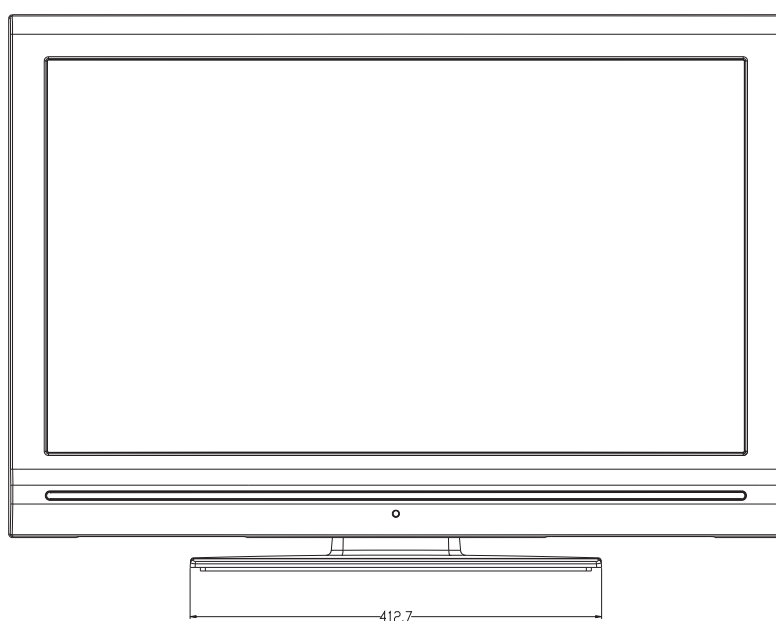
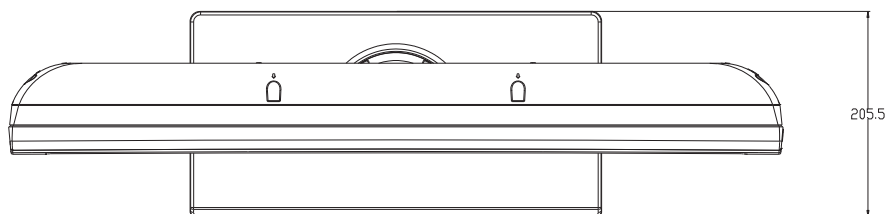
Note: When the TV is switched to standby mode, standby LED can blink to indicate that features such as Standby Search, Over Air Download or Timer is active.

To Switch the TV Off

- Switch the "I" button on the bottom right hand side under the screen to position 2 as illustrated, ② ①. To isolate the TV from the mains, the LED will go out.
- If the TV will not be used for a long period i.e. holidays, then unplug the power cord from the mains socket.

DIMENSIONS

Dimensional Drawings



PANEL

16:9 display, 32" (80 cm) Screen Size

DIMENSIONS (mm)

DxLxH (With foot): 212 x 776 x 567

Weight (Kg): 12,30

DxLxH (Without foot): 94 x 776 x 524

Weight (Kg): 11,60

1. INTRODUCTION

17MB60 mainboard is driven by MStar SOC. This IC is capable of handling Video and audio processing, Scaling-Display processing, 3D comb filter, OSD and text processing, LVDS transmitting, channel and MPEG2/4 decoding, integrated DVB-T/C demodulator and media center functionality.

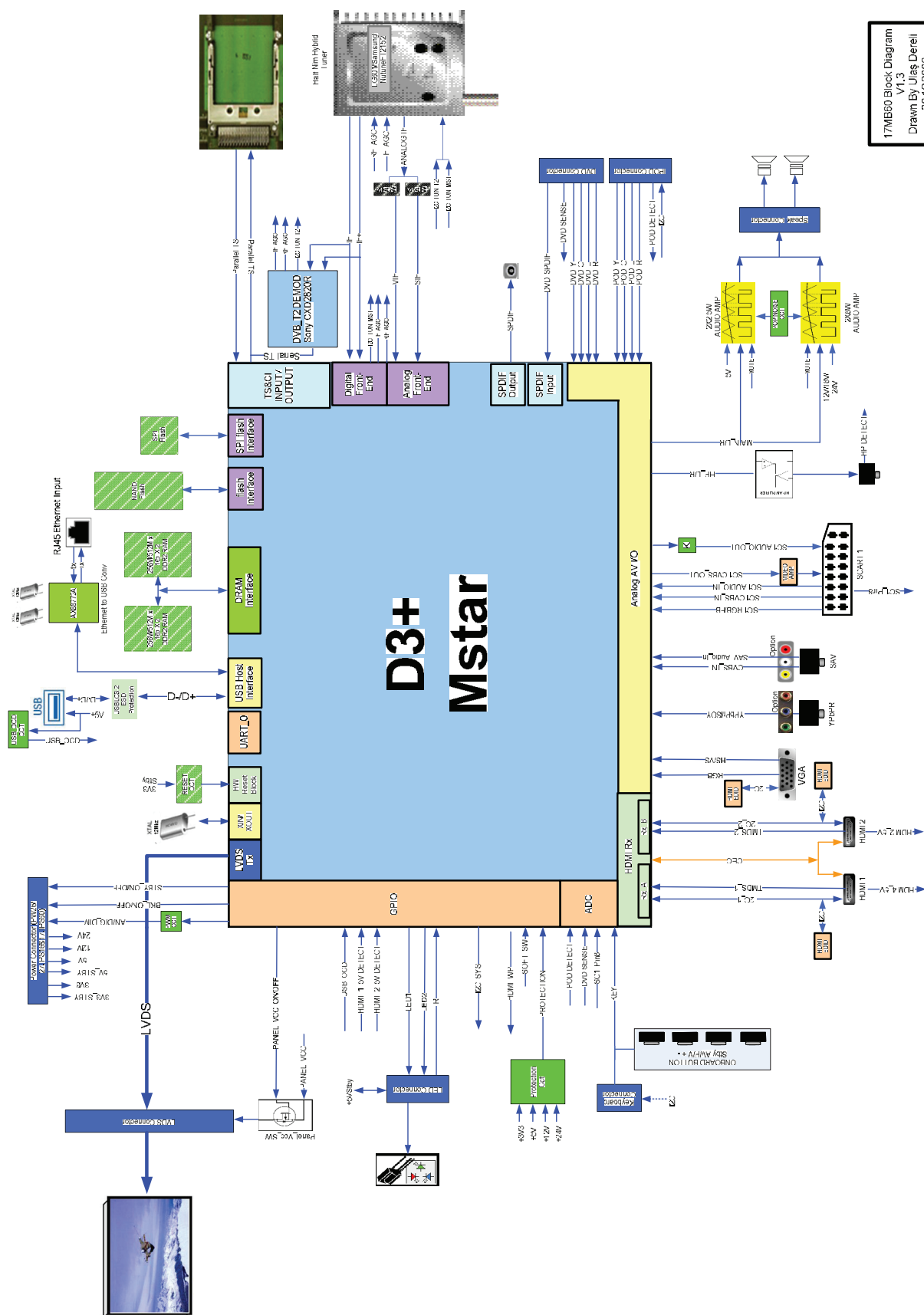
TV supports PAL, SECAM, NTSC color standards and multiple transmission standards as B/G, D/K, I/I', and L/L' including German and NICAM stereo. Also DVB T, DVB-C are supported internal demodulators of MStar IC and DVB-T2 is supported with external demodulator.

Sound system output is supplying max. 2x2,5W (less 10%THD at max output) with 4Ω speakers or 2x6W for stereo 8Ω speakers.

Supported peripherals are:

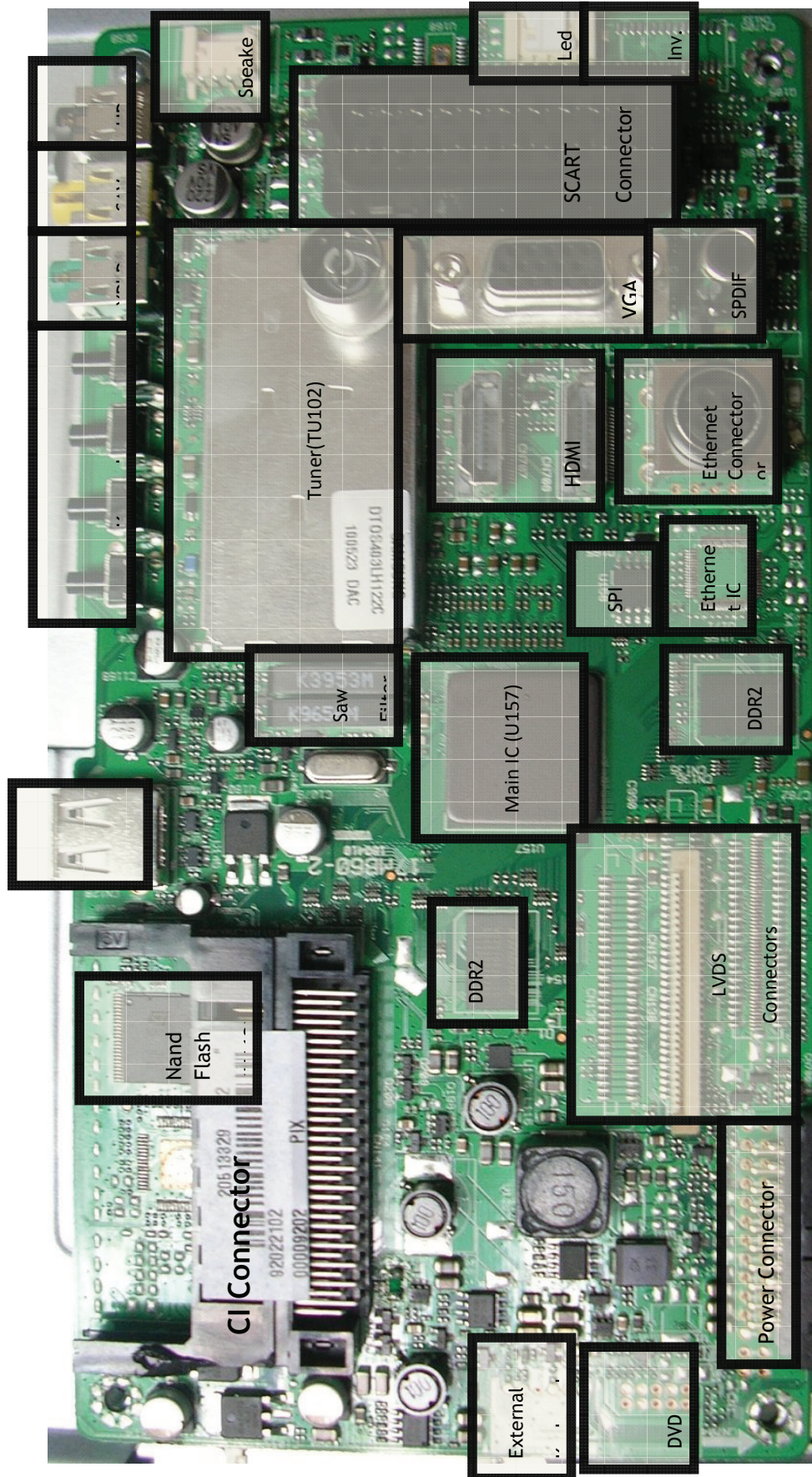
- 1 RF input VHF I, VHF III, UHF @ 750hm(Common)
- 1 Side AV (CVBS, R/L_Audio)
- 1 SCART socket (Common)
- 1 YPbPr (Optional)
- 1 PC input (Common)
- 2 HDMI 1.3 input (1 HDMI input is common, 1 input is optional)
- 1 S/PDIF output (Optional)
- 1 Headphone (Optional)
- 1 Common interface (Common)
- 1 USB (Common)
- 1 DVD (Optional)
- 1 iPod (Optional)
- 1 On-board Keypad (Optional)
- 1 External Keypad (Optional)
- 1 External TouchPad (Optional)

1.1 General Block Diagram



17MB60 Block Diagram
V1.3
Drawn By Ulas Dereli
30.12.2009

1.2 MB60 Placement of Blocks



2.1. General description of Samsung DTOS403LH122X:

The Tuner covers 3 Bands(from 48MHz to 862MHz for COFDM, from 45.25MHz to 863.25MHz for CCIR CH). Band selection and Tuning are performed digitally via the I2C bus.

2.2. Features of DTOS403LH122X:

- Receiving System: This TUNER is designed to cover the air channels in VHF and UHF, compliant with DVB-T standard. and It covers all Analog channels from 48.25MHz to 863.25MHz
- Receiving Channel (Digital, Center frequency):
 - VHF Low CH. E2 ~ S10 (50.5MHz ~ 170.5MHz)
 - VHF High CH. E5 ~ S41 (177.5MHz ~ 466 MHz)
 - UHF CH. E21 ~ E69 (474 MHz ~ 858 MHz)
- Receiving Channel (PAL, Picture carrier frequency):
 - VHF Low CH. E2 ~ S10 (48.25MHz ~ 168.25MHz)
 - VHF High CH. E5 ~ S41 (175.25MHz ~ 463.25MHz)
 - UHF CH. E21 ~ E70 (471.25MHz ~ 863.25MHz)
- Intermediate Frequency:
 - Digital(center) DVB-T (36.167 MHz)
 - Digital(center) DVB-C (36.125 MHz)
 - Analog(picture) 38.9 MHz
- Input Impedance : 75Ω, Unbalanced
- Band Change-Over System : PLL Control System
- Tuning System : Electronic Tuning System With PLL
- Internal(or External) RF AGC function :Built in wideband AGC detector with 6 programmable take-over points

2.3. Pinning:

Pin no.	Terminal Name	Pin Description
1	Ant Power	Active Antenna Power
2	B+	+5V, Supply Voltage (Preamplifier, DC/DC)
3	RF AGC	RF AGC (internal or external mode)
4	CL	I2C Serial Clock
5	DA	I2C Serial Clock
6	BP	+5V, Supply Voltage (RF Amp, PLL, IF Amp)
7	BT(T.P)	+33V, within DC/DC circuit
8	AS	I2C Address Selection of the PLL
9	IF AGC	Control voltage for the IF AGC
10	IF OUT +	Output 2 of the IF Amplifier
11	IF OUT -	Output 1 of the IF Amplifier
12	AIF Output	IF output of the Analog Broad-Band

3. SAW FILTER – Audio – Epcos K9656M(Z101)

3.1. Standard

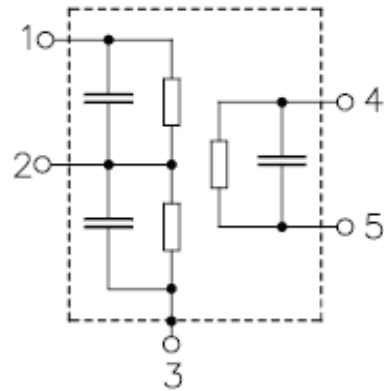
- B/G
- D/K
- I
- L/L'

3.2. Features

- TV IF audio filter with two channels
- Channel 1 (L') with one pass band for sound carriers at 40,40 MHz (L') and 39,75 MHz (L'-NICAM)
- Channel 2 (B/G,D/K,L,I) with one pass band for sound carriers between 32,35 MHz and 33,40 MHz

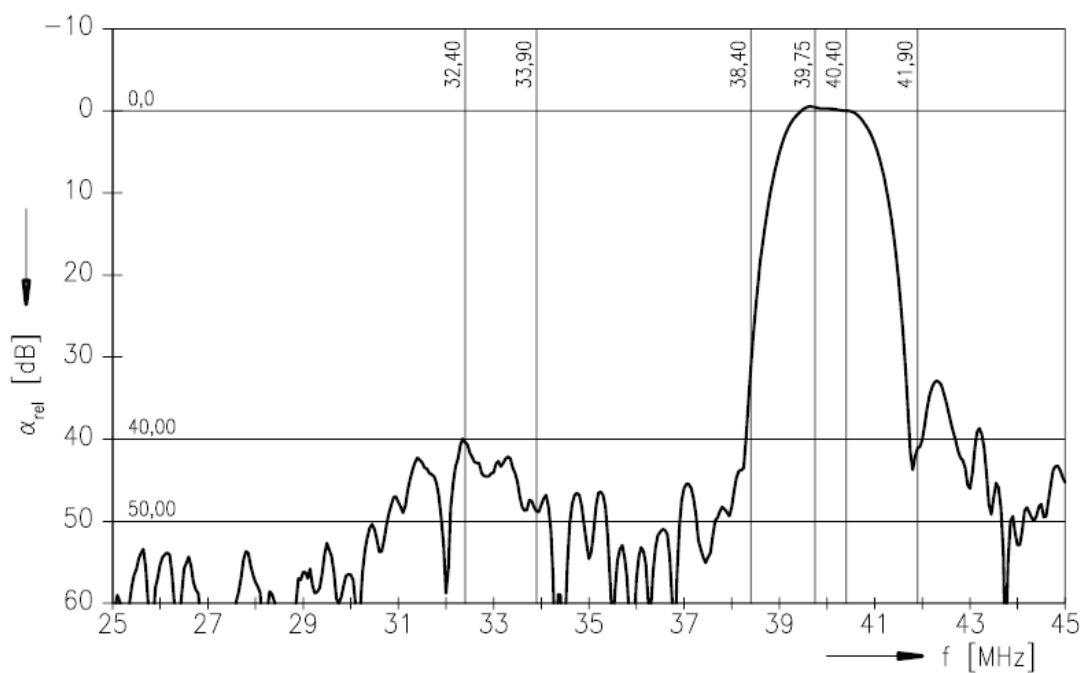
3.3. Pin configuration

- 1 Input
- 2 Switching input
- 3 Chip carrier - ground
- 4 Output
- 5 Output

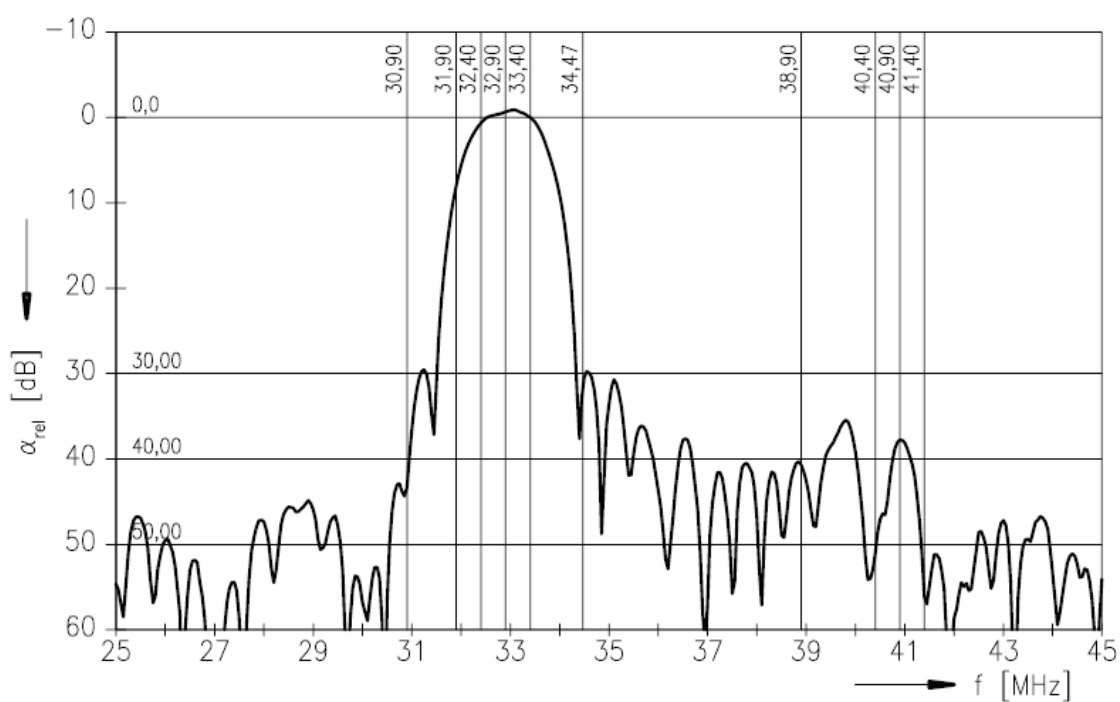


3.4. Frequency response

Frequency response of channel 1



Frequency response of channel 2



4. SAW FILTER – Video – Epcos K3958M(Z102)

4.1. Standard

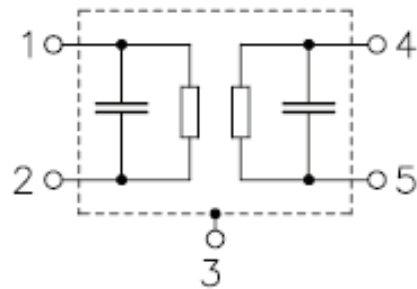
- B/G
- D/K
- I
- L/L'

4.2. Features

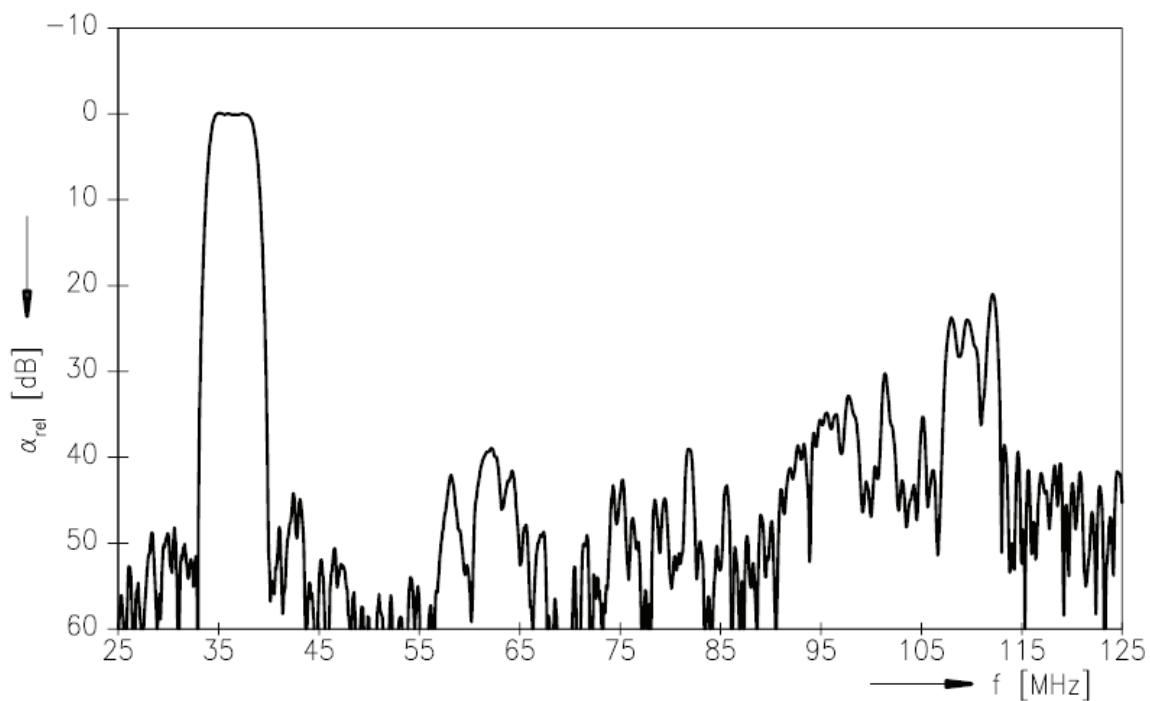
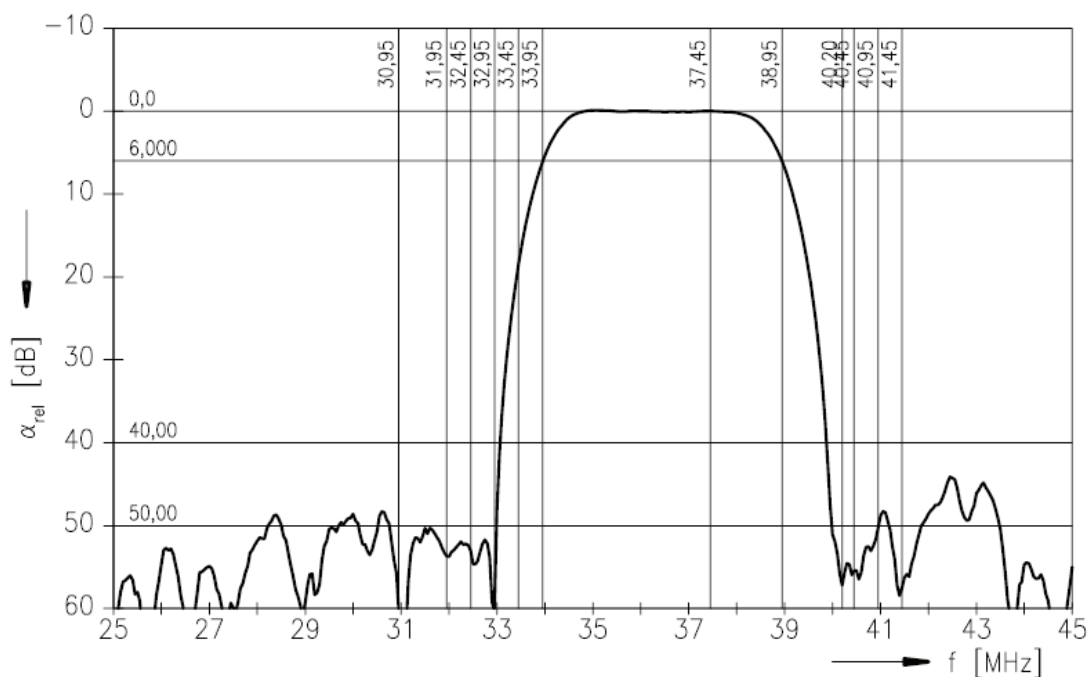
- TV IF filter with Nyquist slopes at 33.90 MHz and 38.90 MHz
- Constant group delay

4.3. Pin configuration:

- 1 Input
- 2 Input - ground
- 3 Chip - carrier ground
- 4 Output
- 5 Output



4.4. Frequency response



5. AUDIO AMPLIFIER STAGE WITH AZAD2102(U163, U164)

5.1.General Description

17MB60 uses two 2,5W Class D Mono Audio Amplifiers for from 16” to 24” TVs. AZAD2102B is a 2.9 Watts (max. can offer 3.0 Watts @ Load = 3Ω , THD=10%, AVdd=DVdd=5.5Volt) with high efficiency filter-free class-D audio power amplifier in a 1613 mm x 1613 mm wafer chip scale package (WCSP). AZAD2102B uses Current-switch technology to achieve high performance class-d amplifier that features 0.03% THD, 85% efficiency, -70 dB PSRR, to improve RF-rectification immunity. AZAD2102B provide a Vibration-Spectrum modulation clock for PWM Output. This vibration frequency is around 10KHZ shift (+/- 5KHZ of Fpwm).

The advantage of the small size package (WCSP) makes AZAD2102B very suitable for mobile phone and PDA device application. And the Class-D amplifier structure let AZAD2102B to have highly efficiency power consumption than Class-AB amplifier. AZAD2102B can shrink the application board, reduce system cost, and external components.

ESD level protection I/O embedded in AZAD2102B. For general applications, doesn't need to add extra ESD protection device (like Varistors) in application system for AZAD2102B's I/O.

5.2.Features

- CMOS Technology
- High Efficiency 85%
- High PSRR 70dB at 217Hz
- Differential OP-amp Input
- AZAD2102B provides Vibration-Spectrum Modulation clock for reduce EMI
- Provide Mute function(set Mute_B to GND will go into Mute status)
- For the input stage AZAD2102B built-in a 10Kohm resistors (Gain setting=29.5dB)
- Maximum Battery Life and Minimum Heat
- Efficiency With an 8- Ω Speaker:
- 3.5 mA Quiescent Current
- Output Power at 10% THD
- 2.85Watts at AVdd=DVdd=5.0Volt, Rload=4 Ω
- 1.45Watts at AVdd=DVdd=3.6Volt, Rload=4 Ω
- 0.30Watts at AVdd=DVdd=3.0Volt, Rload=4 Ω
- 1.75Watts at AVdd=DVdd=5.5Volt, Rload=8 Ω
- 0.87Watts at AVdd=DVdd=3.6Volt, Rload=8 Ω
- 0.41Watts at AVdd=DVdd=3.0Volt, Rload=8 Ω
- Eliminate Power on and Power-off “Pop” noise
- A Fewer External Components
- Optimized PWM Output Stage Eliminates LC Output Filter
- Internally generate 290 kHz Switching Frequency to eliminate Capacitor and Resistor
- Improve PSRR (-70 dB) and Wide Supply Voltage (3.0 V to 5.5 V)
- Fully Differential Design Reduces RF Rectification
- This chip has been built-in a very strong ESD protection.
- System level ESD 4KV (IEC 61000-4-2 ESD Contact Level)
- Wafer Chip Scale Package (WCSP)
- TSSOP Package with Exposed Pad

5.3.Absolute Ratings

5.3.1.Electrical Characteristics

VDD=AVdd=DVdd , VSS=AVss=DVss=Ground

TA = 25°C, Filter Bandwidth = 20 ~20KHz

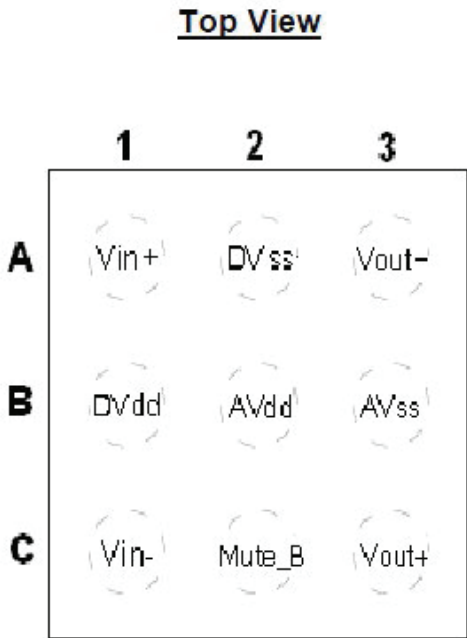
PARAMETER	Symbol	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Operating Voltage	Vop	AVdd=DVdd to AVss=DVss	3.0	5	5.5	V
Output offset voltage	VOS	VDD = 5.5 V, VI = 0 V, AV = 6 V/V		4.5	6.5	mV
		VDD = 3.6 V, VI = 0 V, AV = 6 V/V		2.1	4.0	
		VDD = 3.0 V, VI = 0 V, AV = 6 V/V		1.2	3.0	
Power supply rejection ratio	PSRR	VDD = 3.0 V to 5.5 V, AV = 2 V/V input ac grounded with Ci=2.2uF,Vripple=200mVpp, RL=8Ω,f=217Hz		-68		dB
Common mode rejection ratio	CMRR	VDD = 3.0 V to 5.5 V , Vi c = VDD/2 to 0.5 V, Vi c = VDD/2 to 0.5 VDD -0.8 V,		-65		dB
High level Input current	I _{IHL}	VDD= 5.5V, Vi=5.8V		25		uA
Low level Input current	I _{ILL}	VDD= 5.5V, Vi=-0.3V		1		uA
Operation current	Iop	VDD = 5.5 V, no load		3.6	5.0	mA
		VDD = 3.6 V, no load		3.0	4.2	
		VDD = 3.0 V, no load		2.5	3.5	
Output switching frequency	Fpwm	VDD = 5.5 V, no load		290		KHz
		VDD = 3.6 V, no load		300		
		VDD = 3.0 V, no load		315		
Vibration-Spectrum Modulation clock Range	Fvs	VDD = 5.0 V, no load		+/-5	+/-10	KHz
Under Voltage Protection	UVP	Vin+ and Vin- connect to GND, no load		2.0	2.5	V
Mute_B pin Impedance	RMuB	Mute_B to Ground		270		KΩ
Gain	Gain	VDD=5.0V,Ri=5KΩ+10KΩ (Av=20V/V)	18	20	22	V/V

5.3.2. Operating Specifications

T_A = 25°C, Gain = 20 V/V,

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
P _w	Output power	THD + N = 10%, f = 1 kHz, R _L = 4 Ω	VDD = 5.0 V		2.85		W
			VDD = 3.6 V		1.45		
			VDD = 3.0 V		0.77		
		THD + N = 1%, f = 1 kHz, R _L = 4 Ω	VDD = 5.0 V		2.25		W
			VDD = 3.6 V		1.15		
			VDD = 3.0 V		0.60		
		THD + N = 10%, f = 1 kHz, R _L = 8 Ω	VDD = 5.0 V		1.75		W
			VDD = 3.6 V		0.87		
			VDD = 3.0 V		0.47		
		THD + N = 1%, f = 1 kHz, R _L = 8 Ω	VDD = 5.0 V		1.39		W
			VDD = 3.6 V		0.70		
			VDD = 3.0 V		0.36		
THD+N	Total harmonic distortion plus noise	VDD = 5.0 V, P _O = 1 W, R _L = 8 Ω, f = 1 kHz			0.15		%
		VDD = 3.6 V, P _O = 0.5 W, R _L = 8 Ω, f = 1 kHz			0.12		
		VDD = 3.0 V, P _O = 200 mW, R _L = 8 Ω, f = 1 kHz			0.09		
PSRR	Supply ripple rejection ratio	VDD = 3.6 V, A _v = 20V/V, Inputs connect to grounded with C _i = 1.0μF	F = 217 Hz, V _{Ripple} = 200 mVpp		-67		dB
SNR	Signal-to-noise ratio	VDD = 5 V, P _O = 1 W, R _L = 8 Ω			95		dB
V _{noise}	Output noise level	VDD = 3.6 V, f = 20 Hz to 20 kHz, Inputs ac-grounded with C _i = 1.0μF	No weighting		45		μVRMS
			A weighting		40		
CMRR	Common mode rejection ratio	VDD = 3.6 V, V _{in} = 100mVpp	f = 217 Hz		-72		dB
Z _I	Input impedance			8	10	12	kΩ
Z _F	Feedback resistor			120	150	180	kΩ

5.4. Pinning



Pad Location	Pad Name	I/O	Function
A1	Vin+	I	Non-inverting Input
B1	DVdd		Supply Voltage for control circuit
C1	Vin-	I	Inverting Input
A2	DVss		Ground pad for control circuit
B2	AVdd		Supply Voltage for Power MOS
C2	Mute_B	I	Mute control pin
A3	Vout-	O	Negative Output
B3	AVss		Ground pad for Power MOS
C3	Vout+	O	Positive Output

6. AUDIO AMPLIFIER STAGE WITH TPA3113(U168)

6.1. General Description

17MB60 uses a 6W Class D Mono Audio Amplifiers for from 26" to 32" TVs. The TPA3113D2 is a 6-W (per channel) efficient, Class-D audio power amplifier for driving bridged-tied stereo speakers. Advanced EMI Suppression Technology enables the use of inexpensive ferrite bead filters at the outputs while meeting EMC requirements. SpeakerGuard™ speaker protection circuitry includes an adjustable power limiter and a DC detection circuit. The adjustable power limiter allows the user to set a "virtual" voltage rail lower than the chip supply to limit the amount of current through the speaker. The DC detect circuit measures the frequency and amplitude of the PWM signal and shuts off the output stage if the input capacitors are damaged or shorts exist on the inputs.

The TPA3113D2 can drive stereo speakers as low as 4 Ω . The high efficiency of the TPA3113D2, 87%, eliminates the need for an external heat sink when playing music.

The outputs are also fully protected against shorts to GND, VCC, and output-to-output. The short-circuit protection and thermal protection includes an auto-recovery feature.

6.2. Features

- 6-W/ch into an 8- Ω Loads at 10% THD+N From a 10-V Supply
- 12-W into a 4- Ω Mono Load at 10% THD+N From a 10-V Supply
- 87% Efficient Class-D Operation Eliminates Need for Heat Sinks
- Wide Supply Voltage Range Allows Operation from 8 V to 26 V
- Filter-Free Operation
- SpeakerGuard™ Speaker Protection Includes Adjustable Power Limiter plus DC Protection
- Flow Through Pin Out Facilitates Easy Board Layout
- Robust Pin-to-Pin Short Circuit Protection and Thermal Protection with Auto Recovery Option
- Excellent THD+N / Pop-Free Performance
- Four Selectable, Fixed Gain Settings
- Differential inputs

6.3. Absolute Ratings

6.3.1. Electrical Characteristics

DC CHARACTERISTICS

$T_A = 25^\circ\text{C}$, $V_{CC} = 12\text{ V}$, $R_L = 8\ \Omega$ (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
V _{OS}	Class-D output offset voltage (measured differentially)	V _I = 0 V, Gain = 36 dB			1.5	15	mV
I _{CC}	Quiescent supply current	$\overline{SD}$ = 2 V, no load, PV _{CC} = 12V			20	35	mA
I _{CC(SD)}	Quiescent supply current in shutdown mode	$\overline{SD}$ = 0.8 V, no load, PV _{CC} = 12V			200		μA
r _{DS(on)}	Drain-source on-state resistance	V _{CC} = 12 V, I _O = 500 mA, T _J = 25°C	High Side		400		mΩ
			Low side		400		
G	Gain	GAIN1 = 0.8 V	GAIN0 = 0.8 V	19	20	21	dB
			GAIN0 = 2 V	25	26	27	
		GAIN1 = 2 V	GAIN0 = 0.8 V	31	32	33	dB
			GAIN0 = 2 V	35	36	37	
t _{ON}	Turn-on time	$\overline{SD}$ = 2 V			14		ms
t _{OFF}	Turn-off time	$\overline{SD}$ = 0.8 V			2		μs
GVDD	Gate Drive Supply	I _{GVDD} = 2mA		6.4	6.9	7.4	V
V _O	Output Voltage maximum under PLIMIT control	V _(PLIMIT) = 2 V; V _I = 1V rms		6.75	7.90	8.75	V

6.3.2. Operating Specifications

AC CHARACTERISTICS

$T_A = 25^\circ\text{C}$, $V_{CC} = 12\text{ V}$, $R_L = 8\ \Omega$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
K_{SVR} Supply ripple rejection	200 mV _{PP} ripple from 20 Hz–1 kHz, Gain = 20 dB, Inputs ac-coupled to AGND		–70		dB
THD+N Total harmonic distortion + noise	$R_L = 8\ \Omega$, $f = 1\text{ kHz}$, $P_O = 3\text{ W}$ (half-power)		0.06		%
V_n Output integrated noise	20 Hz to 22 kHz, A-weighted filter, Gain = 20 dB		65		μV
			–80		dBV
Crosstalk	$P_O = 1\text{ W}$, Gain = 20 dB, $f = 1\text{ kHz}$		–100		dB
SNR Signal-to-noise ratio	Maximum output at THD+N < 1%, $f = 1\text{ kHz}$, Gain = 20 dB, A-weighted		102		dB
f_{OSC} Oscillator frequency		250	310	350	kHz
Thermal trip point			150		$^\circ\text{C}$
Thermal hysteresis			15		$^\circ\text{C}$

6.4. Pinning

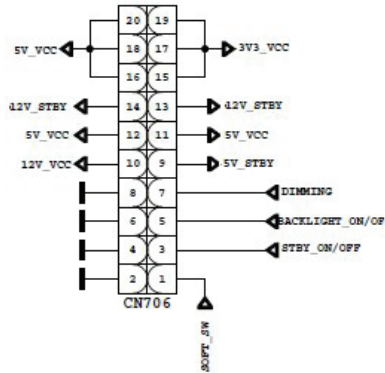
PIN			
NAME	Pin Number	I/O/P	DESCRIPTION
$\overline{\text{SD}}$	1	I	Shutdown logic input for audio amp (LOW = outputs Hi-Z, HIGH = outputs enabled). TTL logic levels with compliance to AVCC.
$\overline{\text{FAULT}}$	2	O	Open drain output used to display short circuit or dc detect fault status. Voltage compliant to AVCC. Short circuit faults can be set to auto-recovery by connecting $\overline{\text{FAULT}}$ pin to $\overline{\text{SD}}$ pin. Otherwise, both short circuit faults and dc detect faults must be reset by cycling PVCC.
LINP	3	I	Positive audio input for left channel. Biased at 3V.
LINN	4	I	Negative audio input for left channel. Biased at 3V.
GAIN0	5	I	Gain select least significant bit. TTL logic levels with compliance to AVCC.
GAIN1	6	I	Gain select most significant bit. TTL logic levels with compliance to AVCC.
AVCC	7	P	Analog supply
AGND	8		Analog signal ground. Connect to the thermal pad.
GVDD	9	O	High-side FET gate drive supply. Nominal voltage is 7V. Also should be used as supply for PLIMIT function
PLIMIT	10	I	Power limit level adjust. Connect a resistor divider from GVDD to GND to set power limit. Connect directly to GVDD for no power limit.
RINN	11	I	Negative audio input for right channel. Biased at 3V.
RINP	12	I	Positive audio input for right channel. Biased at 3V.
NC	13		Not connected
PBTL	14	I	Parallel BTL mode switch
PVCCR	15	P	Power supply for right channel H-bridge. Right channel and left channel power supply inputs are connect internally.
PVCCR	16	P	Power supply for right channel H-bridge. Right channel and left channel power supply inputs are connect internally.
BSPR	17	I	Bootstrap I/O for right channel, positive high-side FET.
OUTPR	18	O	Class-D H-bridge positive output for right channel.
PGND	19		Power ground for the H-bridges.
OUTNR	20	O	Class-D H-bridge negative output for right channel.
BSNR	21	I	Bootstrap I/O for right channel, negative high-side FET.
BSNL	22	I	Bootstrap I/O for left channel, negative high-side FET.
OUTNL	23	O	Class-D H-bridge negative output for left channel.
PGND	24		Power ground for the H-bridges.
OUTPL	25	O	Class-D H-bridge positive output for left channel.
BSPL	26	I	Bootstrap I/O for left channel, positive high-side FET.
PVCCL	27	P	Power supply for left channel H-bridge. Right channel and left channel power supply inputs are connect internally.
PVCCL	28	P	Power supply for left channel H-bridge. Right channel and left channel power supply inputs are connect internally.

7. POWER STAGE

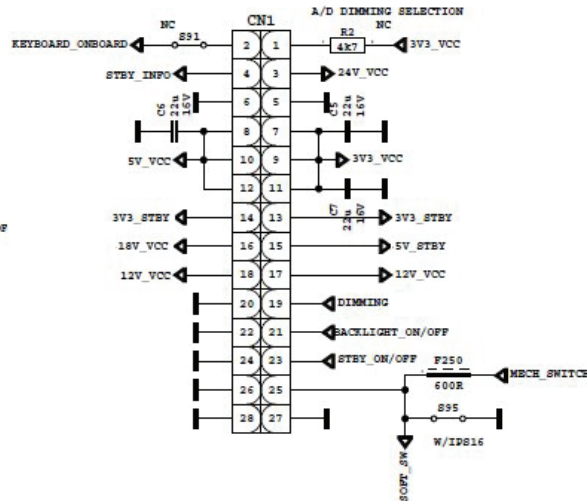
The DC voltages required at various parts of the chassis and panel are provided by a main power supply unit. MB60 chassis can operate with IPS60, IPS16, IPS17, PW26, PW27 as main power supply and also with 12V adaptor.

CN706 is used for IPS60, IPS16 and IPS17 and CN1 is used for PW26 and PW27.

16" to 24" POWER SOCKET

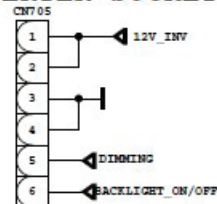


26" to 32" POWER SOCKET

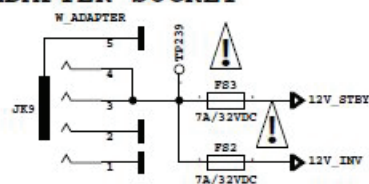


JK9 is used for the adapter option and also CN705 inverter socket or DB32 chassis with CN706 is used to supply backlight.

INVERTER SOCKET W/ADAPTER

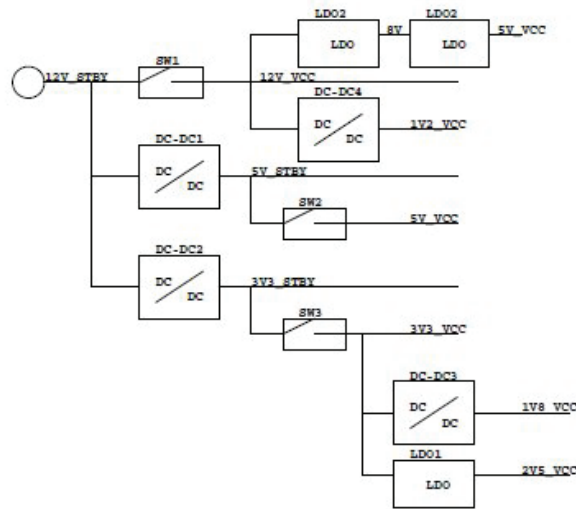


ADAPTER SOCKET



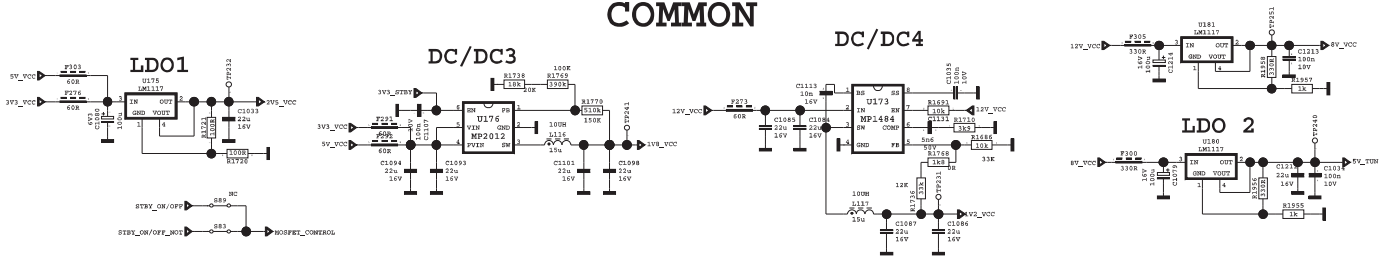
The power supplies generate 18V, 12V, 5V, 3,3V and 12V, 5V, standby mode DC voltages. Power stage which is on-chassis generates 5V, 3V3 stand by voltage and 12V, 8V, 5V, 3V3, 2.5V, 1,8V and 1,2V supplies for other different parts of the chassis. Chassis block diagram is indicated below.

POWER BLOCK DIAGRAM



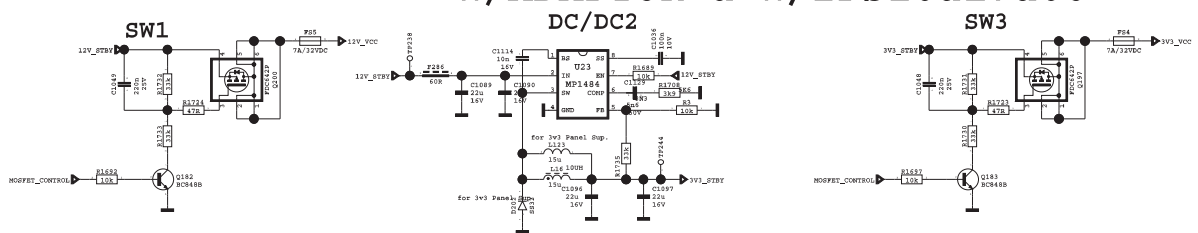
The blocks on power block diagram is using dependent to main supply. For PW26 and PW27 just common blocks are enough for proper operation.

COMMON

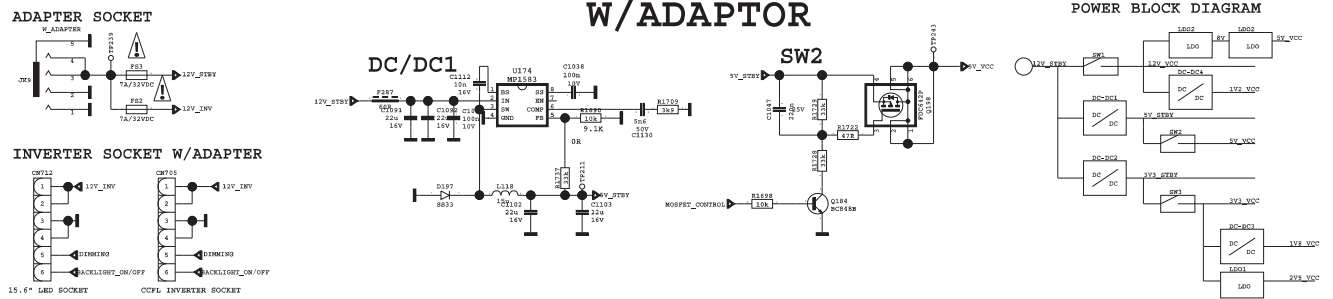


For IPS16, IPS17, IPS60 below blocks must work properly.

W/ADAPTOR & W/IPS16&17&60

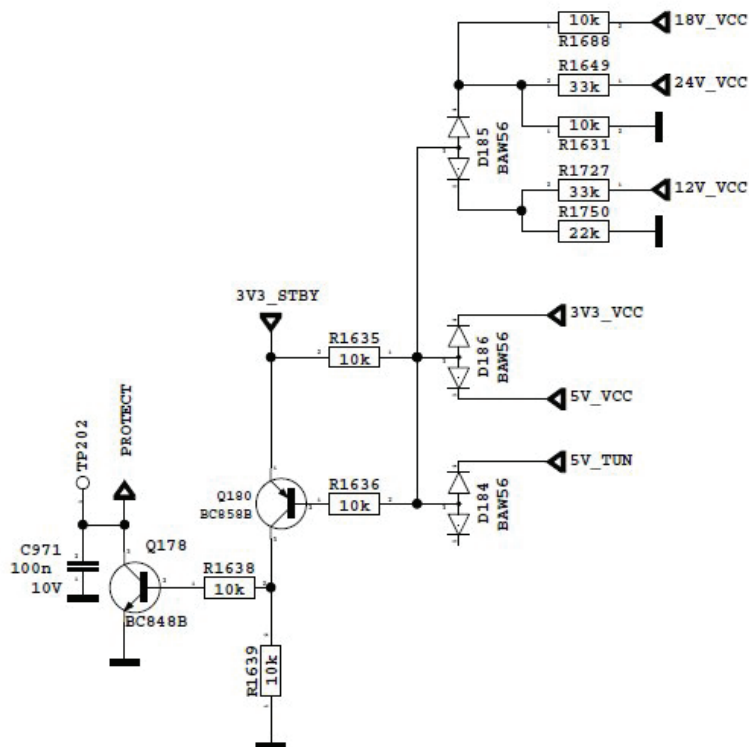


For adopter case also below blocks are necessary.

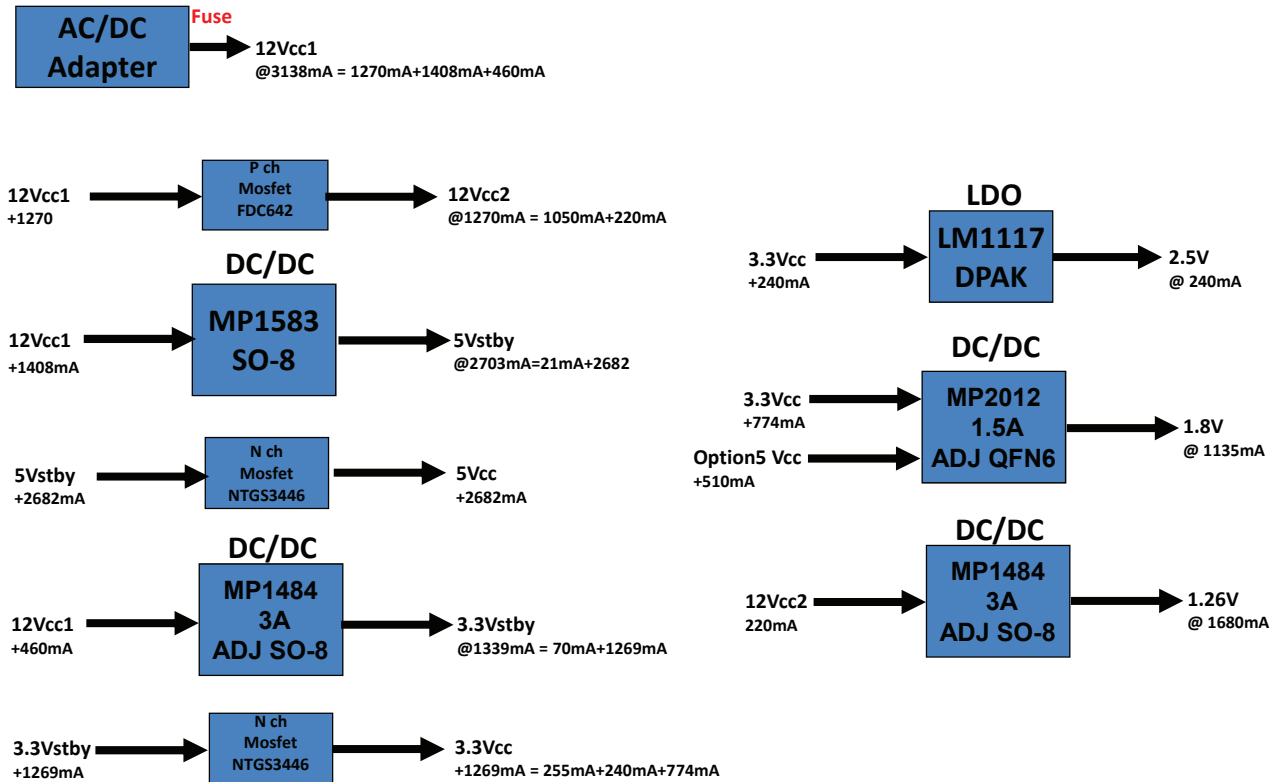


7.1.Short CCT Protection Circuit

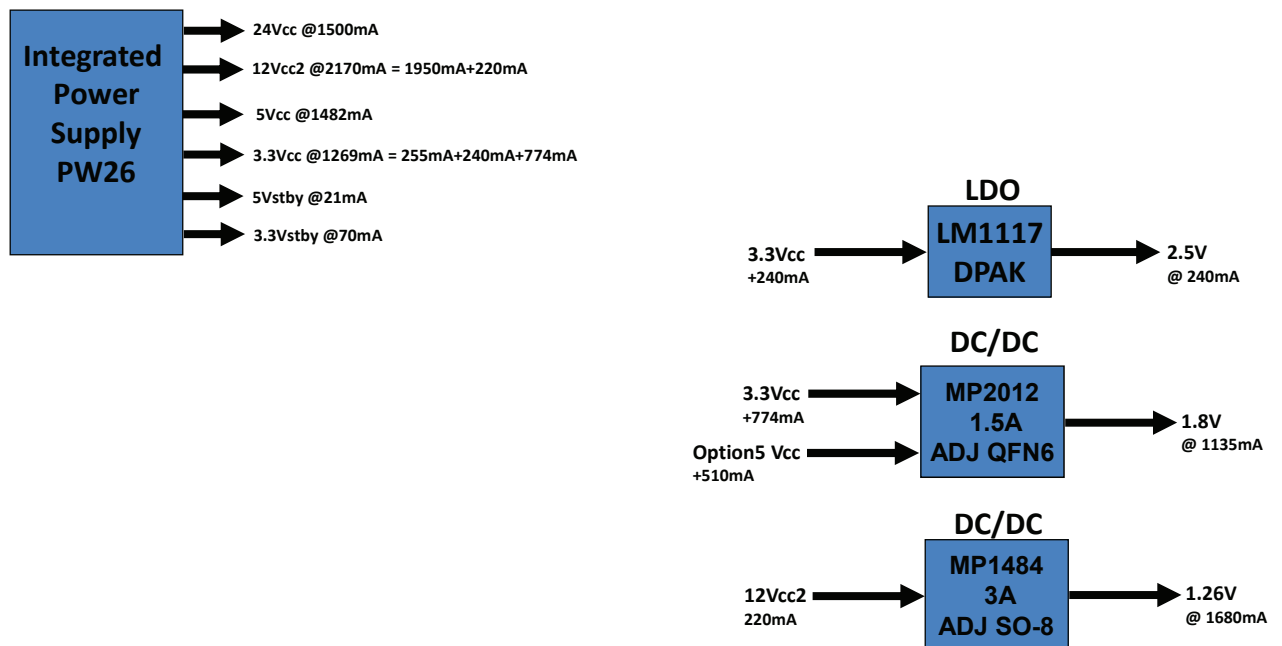
Short circuit protection is necessary for protecting chassis and main IC against damages when any Vcc supply shorts to ground. Protect pin should be logic high while normal operation. When there is a short circuit protect pin should be logic low. After any short detection, SW forces LEDs on LED card to blink.



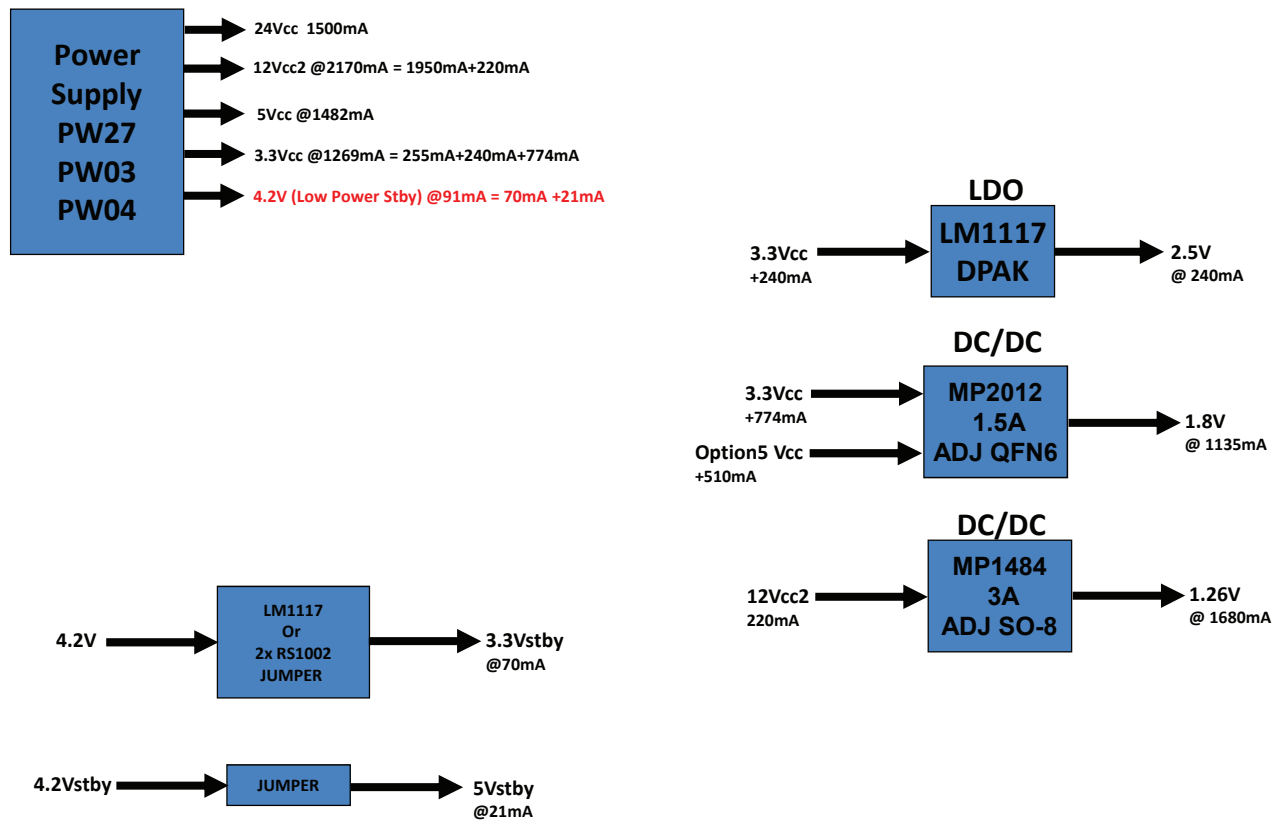
Power Management -- W/Adapter



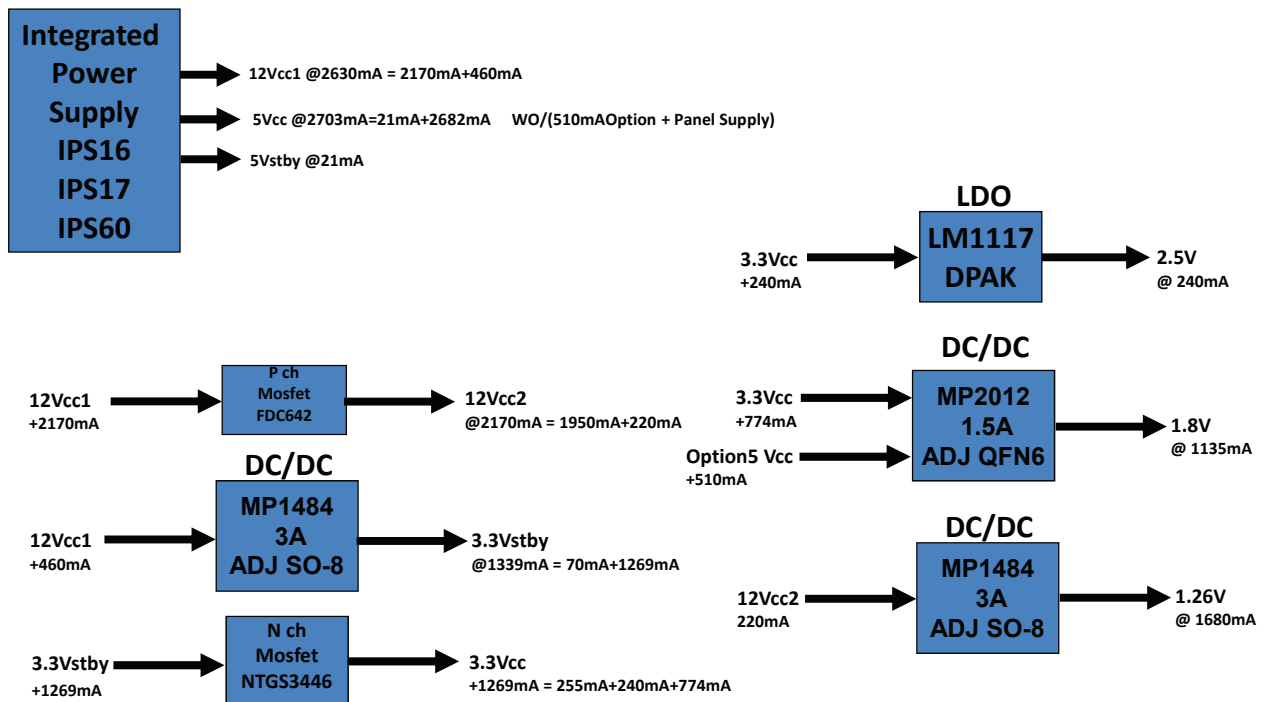
MB60 Power Management W/PW26



MB60 Power Management W/PW27 & PW03 & PW04



MB60 Power Management W/IPS16 & IPS17 & IPS60



8. MICROCONTROLLER – MSTAR(U157)

8.1.General Description

The MSD9WB7PX-2 integrates DTV/multi-media all-purpose AV decoder, DVB-T demodulator, VIF demodulator, and Sound/Video processor into a single device. This allows the overall BOM to be reduced significantly making the MSD9WB7PX-2 a very competitive multi-media DTV solution. For ATV users, the MSD9WB7PX-2 provides multi-standard analog TV support with adaptive 3D video decoding and VBI data extraction. The build-in audio decoder is capable of decoding FM, AM, NICAM, A2, BTSC and EIA-J sound standards. The MSD9WB7PX-2 supplies all the necessary A/V inputs and outputs to complete a receiver design including a multi-port HDMI receiver and component video ADC. All input selection multiplexed for video and audio are integrated, including full SCART support with CVBS output. The equipped MStar MACE-5 color engine is the latest masterpiece from MStar famous color engine series providing excellent video and picture quality in Full-HD and large-scale displaying system. To meet the increasingly popular energy legislative requirements without the use of additional hardware, the MSD9WB7PX-2 has an ultra low power standby mode during which an embedded MCU can act upon standby events and wake up the system as required.

8.2.General Features

MSD9WB9PX-2, an SOC solution that supports channel decoding, MPEG decoding, and media-centre functionality enabled by a high performance AV CODEC and CPU Key features include,

- Digital and Analog DVB Front-End Demodulator
- A Multi-Standard A/V Format Decoder
- The MACE-5 Video Processor
- Home Theater Sound Processor
- Peripheral and Power Management

Transport Stream De-multiplexer

- Supports parallel and serial TS interface, with or without sync signal
- Supports TS input and output for external CI module
- Maximum TS data rate is 104 Mb/sec for serial or 16 MB/sec for parallel
- 32 general purpose PID filters and section filters for each transport stream de-multiplexer
- Supports additional audio/video/PCR filters
- Supports TS DMA channel for time-shift
- Supports 3DES/DES and AES encryption/decryption

MPEG-2 Video Decoder

- ISO/IEC 13818-2 MPEG-2 video MP@HL
- Automatic frame rate conversion
- Supports resolution up to HDTV (1080i, 720p) and SDTV

MPEG-4 Video Decoder

- ISO/IEC 14496-2 MPEG-4 ASP video decoding
- Supports resolutions up to HDTV (1080p@30fps)
- Supports DivX1 Home Theater & HD profiles (Optional)
- Supports VC-1Optional, FLV video format decoding

H.264 Decoder

- ITU-T H.264, ISO/IEC 14496-10 (main and high profile up to level 4.1) video decoding
- Supports resolutions for all DVB, ATSC, HDTV, DVD and VCD
- Supports resolution up to 1080p@30fps
- Supports CABAC and CAVLC stream types
- Processing of ES and PES streams, extraction and provision of time stamps
- Up to 40 Mbits bit rate (Bluray spec.)

Hardware JPEG

- Supports sequential mode, single scan
- Supports both color and grayscale pictures
- Following the file header scan the hardware decoder fully handles the decode process
- Supports programmable Region of Interest (ROI)
- Supports formats: 422/411/420/444/422T
- Supports scaling down ratios: 1/2, 1/4, 1/8
- Supports picture rotation

NTSC/PAL/SECAM Video Decoder

- Supports NTSC-M, NTSC-J, NTSC-4.43, PAL (B, D, G, H, M, N, I, Nc), and SECAM standards
- Automatic standard detection
- Motion adaptive 3D comb filter
- Five configurable CVBS & Y/C S-video inputs
- Supports Teletext, Closed Caption (analog CC 608/ analog CC 708/digital CC 608/digital CC 708), V-chip and SCTE

Multi-Standard TV Sound Processor

- SIF audio decoding
- Supports BTSC/A2/EIA-J demodulation
- Supports NICAM/FM/AM demodulation
- Supports MTS Mode Mono/Stereo/SAP in BTSC/EIA-J mode
- Supports Mono/Stereo/Dual in A2/NICAM mode
- Built-in audio sampling rate conversion (SRC)
- Audio processing for loudspeaker channel, including volume, balance, mute, tone, EQ, virtual stereo/surround and treble/bass controls
- Advanced sound processing options available, for example: Dolby, SRS, BBE, QSound, Audyssey
- Supports digital audio format decoding:
- MPEG-1, MPEG-2 (Layer I/II), MP3, Dolby Digital (AC-3), AAC-LC
- Supports Optional Dolby Digital Plus, Dolby Pulse, and MS10 multi-stream decoder, including Dolby Digital Encoder for transcoding streams to Dolby Digital 5.1 (DDCO)
- Supports MPEG Audio, Dolby Digital, Dolby Digital Plus format AD (Audio Description)
- Supports PVR and time-shifting

Audio Interface

One SIF audio input interface with minimal external saw filters

- Four L/R audio line-inputs including Mic. input

- Two L/R outputs for main speakers and additional line-outputs
- Supports stereo headphone driver
- I2S digital audio input & output
- S/PDIF digital audio output
- HDMI audio channel processing
- Programmable delay for audio/video synchronization

Analog RGB Compliant Input Port

- Three analog ports support up to 1080P
- Supports PC RGB input up to SXGA@75Hz
- Supports HDTV RGB/YPbPr/YCbCr
- Supports Composite Sync and SOG Sync-on-Green
- Automatic color calibration
- AV-link support

Analogue RGB Auto-Configuration & Detection

- Auto input signal format and mode detection
- Auto-tuning function including phasing, positioning, offset, gain, and jitter detection
- Sync Detection for H/V Sync

DVI/HDCP/HDMI Compliant Input Port

- Three HDMI/DVI Input ports
- HDMI 1.3 Compliant
- HDCP 1.1 Compliant
- 225MHz @ 1080P 60Hz input with 12-bit Deep-color support
- CEC support
- Single link DVI 1.0 compliant
- Robust receiver with excellent long-cable support

MStar Advanced Color Engine (MStarACE-5)

- 10/12-bit internal data processing
- Fully programmable multi-function scaling engine
- Nonlinear video scaling supports various modes including Panorama
- Supports dynamic scaling for VC-1
- High-Quality DTV video processor
- 3D motion video deinterlacer with motion object stabilizer
- Edge-oriented deinterlacer with edge and artifact smoother
- Automatic 3:2/2:2/M:N pull-down detection and recovery
- 3D multi-purpose noise reduction for DTV or lousy air/cable input
- MPEG artifact removal including de-blocking and mosquito noise reduction
- Arbitrary frame rate conversion
- MStar Professional Picture Enhancement:
 - Dynamic brilliant and fresh color
 - Dynamic Blue Stretch
 - Intensified contrast and details

- Dynamic Vivid Skin
- Dynamic sharpened Luma/Chroma edges
- Global and local dynamic depth of field perception
- Accurate and independent color control
- Supports sRGB and xvYCC color processing
- Supports HDMI 1.3 deep color format
- Programmable 12-bit RGB gamma CLUT

Output Interface

- Single/dual link 8/10-bit LVDS output
- Supports panel resolution up to Full-HD (1920x1080) @ 60Hz
- Supports TH/TI format
- Supports dithering options to 6/8-bit output
- Spread spectrum output for EMI suppression

CVBS Video Encoder

- Supports all NTSC/PAL TV Standard
- Stand-alone scaling engine
- Programmable Hue, Contrast, Brightness
- Supports TTX/CC/WSS output

CVBS Video Output

- Allows CVBS output of all source inputs

2D Graphics Engine

- Hardware Graphics Engine for responsive interactive applications
- Supports point draw, line draw, rectangle draw/fill, text draw and trapezoid draw
- BitBlt, stretch BitBlt, trapezoid BitBlt, mirror BitBlt and rotate BitBlt
- Raster Operation (ROP)
- Support Porter-Duff

VIF Demodulator

- Compliant with NTSC M/N, PAL B, G/H, I, D/K, SECAM L/L' standards
- Audio/Video dual-path processor
- Stepped-gain PGA with 25 dB tuning range and 1 dB tuning resolution
- Maximum IF gain of 37 dB
- Programmable TOP to accommodate different tuner gain and SAW filter insertion loss to optimize noise and linearity performance
- Multi-standard processing with single SAW
- Supports silicon tuner low IF output architecture

DVB-T/DVB-C Demodulator

- Digital carrier frequency offset correction: $\pm 500\text{kHz}$
- Optimized for SFN channels with pre/post-cursive echoes inside/outside the guard
- Acquisition range $\pm 857\text{kHz}$ includes up to 3x: $\pm 1/6\text{ MHz}$ transmitter offset
- Meets Nordig Unified 1.0.3, D-Book 5.0, EICTA E-Book/C-Book test requirement
- ITU J.83 Annex A/C, DVB-C (EN 300 429) compliant

- Supports DVB-C 0.7-7M Baud symbol rate
- $\pm 400\text{kHz}$ internal carrier offset recovery range
- 6.8 μsecs echo cancellation at 7 Msym/s
- Supports IF, low-IF, zero-IF inputs
- Ultra-fast automatic blind UHF/VHF channel scan (constellations and symbol rate)

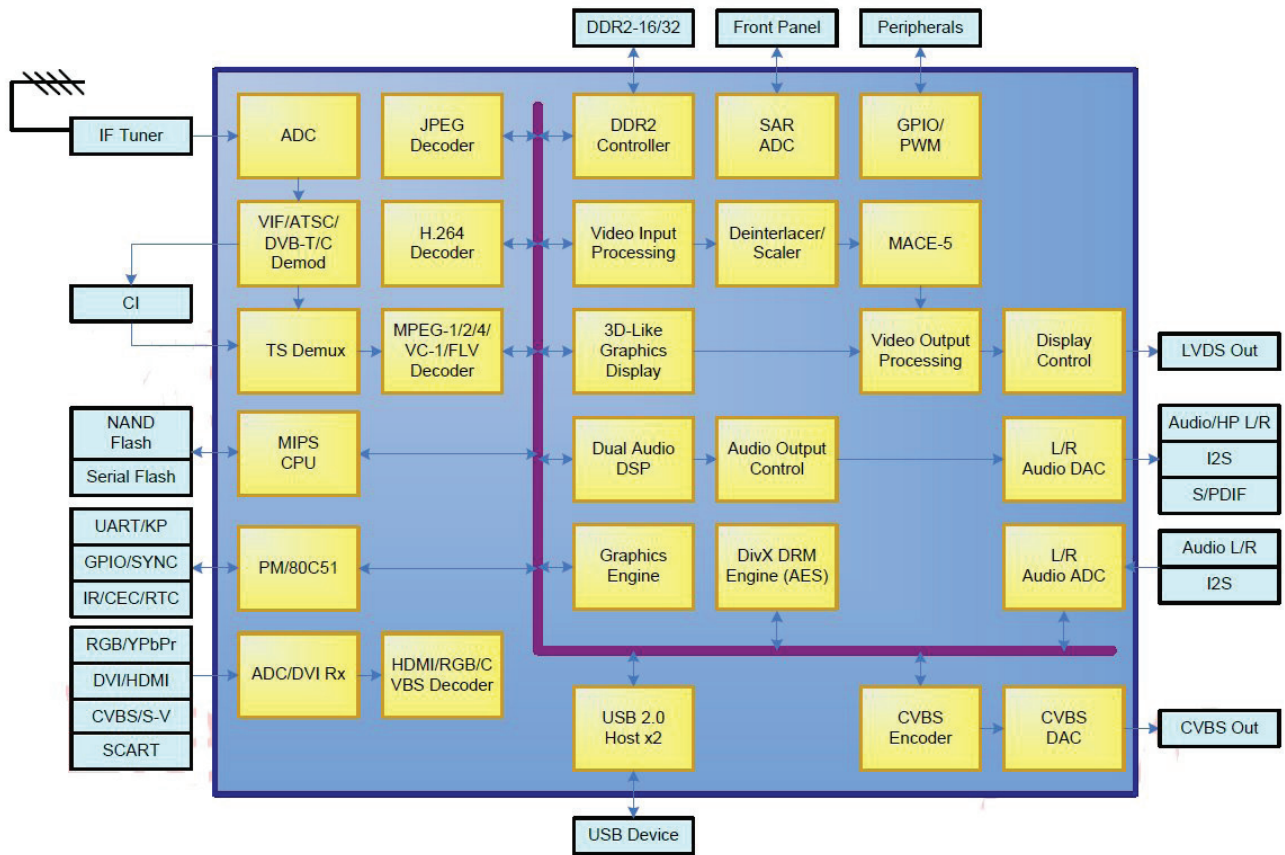
Connectivity

- Two USB 2.0 host ports
- USB architecture designed for efficient support of external storage devices in conjunction with off air broadcasting

Miscellaneous

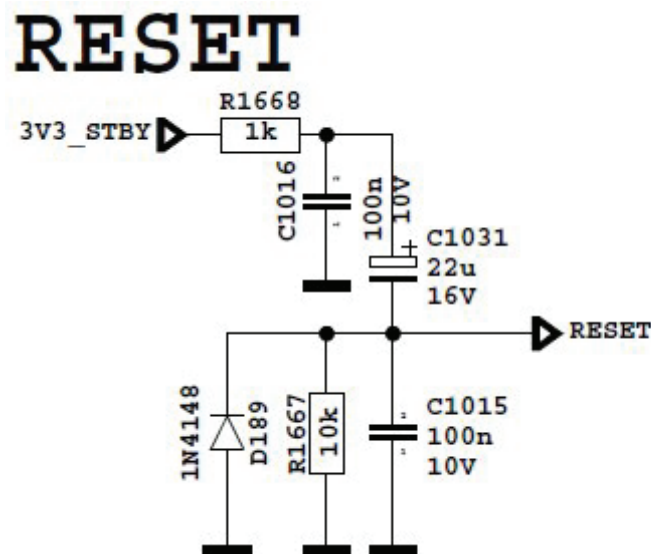
- DRAM interface supporting two 16-bit DDR2 @ 1066MHz
- Supports PVR
- Supports Common Interface for conditional access support
- Bootable SPI interface with serial flash support
- Parallel interface for external OneNAND and NAND flash support
- Power control module with ultra low power
- MCU available in standby mode
- 523-ball LFBGA package
- Operating Voltages: 1.26V (core), 1.8V (DDR2), 2.5V and 3.3V (I/O and analog)

8.3.MSTAR Block Diagram



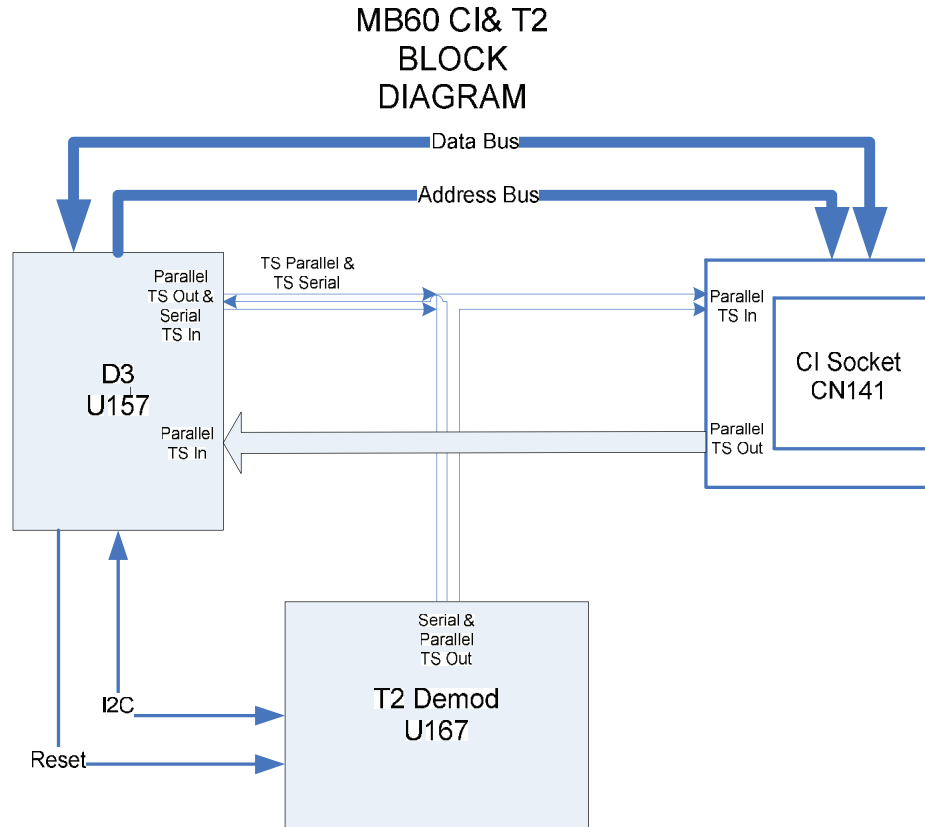
8.4.Reset Circuit

Reset circuit using for initializing main MStar IC. Reset condition is high and normal working condition is low for RESET pin.



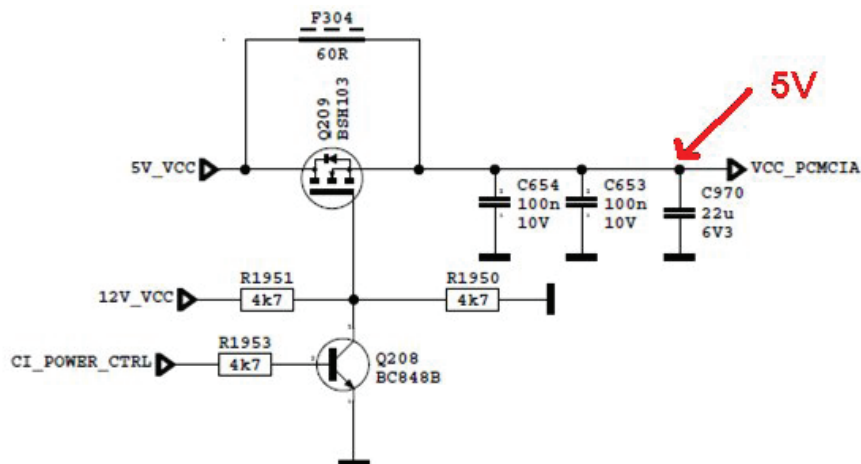
9. CI INTERFACE

9.1 Block Diagram



9.2 CI Interface Power Switch

It is used for CI module supply, when Module is inserted (it means CI detect is low) This circuit is opened or closed by CI_POWER_CTRL port of main μ Controller



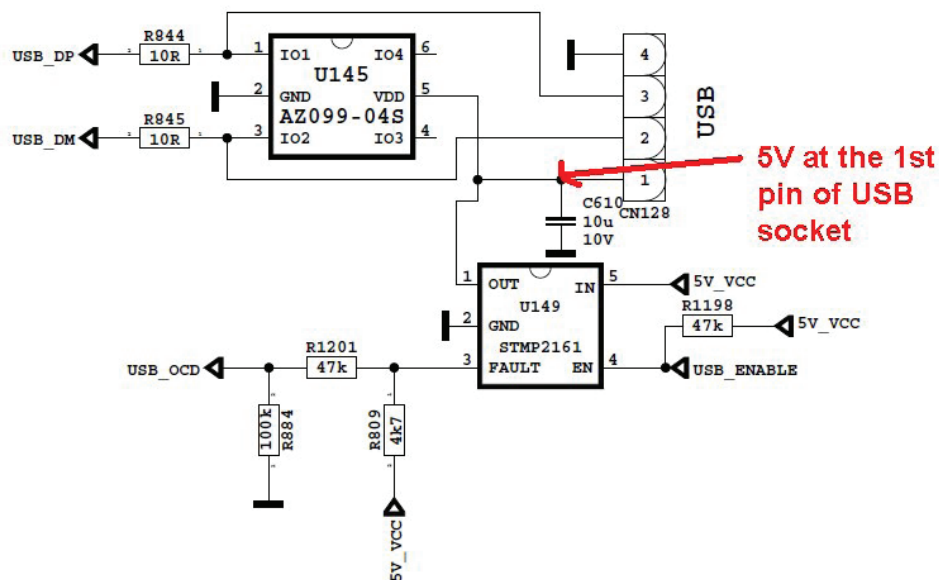
10. USB INTERFACE

Main Concept IC has integrated 2 USB 2.0 interface. One of them is used for Ethernet function, the other one is used for USB connectivity for last user. Last user can play video, picture and audio files. Also digital channels can be record to external storage device by this interface. All SW files can be updated with interface.

USB circuit has 3 main parts

- Integrated USB 2.0 Host interface of D3 (U157)
- Protection IC (U145)
- Over Current Protection IC (U149)

USB INTERFACE



11. DDR2 SDRAM 8M × 4 BANKS × 16 BIT (W9751G6JB) (U154, U155)

11.1 General Description

The W9751G6JB is a 512M bits DDR2 SDRAM, organized as 8,388,608 words × 4 banks × 16 bits. This device achieves high speed transfer rates up to 1066Mb/sec/pin (DDR2-1066) for general applications. W9751G6JB is sorted into the following speed grades: -18, -25 and -3. The -18 is compliant to the DDR2-1066/CL7 specification. The -25 is compliant to the DDR2-800 (5-5-5) or DDR2-800 (6-6-6) specification. The -3 is compliant to the DDR2-667 (5-5-5) specification. All of the control and address inputs are synchronized with a pair of externally supplied differential clocks. Inputs are latched at the cross point of differential clocks (CLK rising and CLK falling). All I/Os are synchronized with a single ended DQS or differential DQS- DQS pair in a source synchronous fashion.

11.2 Features

- Power Supply: VDD, VDDQ = 1.8 V ± 0.1 V
- Double Data Rate architecture: two data transfers per clock cycle
- CAS Latency: 3, 4, 5, 6 and 7
- Burst Length: 4 and 8
- Bi-directional, differential data strobes are transmitted / received with data
- Edge-aligned with Read data and center-aligned with Write data
- DLL aligns DQ and DQS transitions with clock
- Differential clock inputs (CLK and CLK)
- Data masks (DM) for write data
- Commands entered on each positive CLK edge, data and data mask are referenced to both edges of DQS
- Posted CAS programmable additive latency supported to make command and data bus efficiency
- Read Latency = Additive Latency plus CAS Latency (RL = AL + CL)
- Off-Chip-Driver impedance adjustment (OCD) and On-Die-Termination (ODT) for better signal quality
- Auto-precharge operation for read and write bursts
- Auto Refresh and Self Refresh modes
- Precharged Power Down and Active Power Down
- Write Data Mask
- Write Latency = Read Latency - 1 (WL = RL - 1)
- Interface: SSTL_18

11.3 Electrical Characteristics

SYM.	PARAMETER	MIN.	TYP.	MAX.	UNIT	NOTES
VDD	Supply Voltage	1.7	1.8	1.9	V	1
VDDL	Supply Voltage for DLL	1.7	1.8	1.9	V	5
VDDQ	Supply Voltage for Output	1.7	1.8	1.9	V	1, 5
VREF	Input Reference Voltage	0.49 × VDDQ	0.5 × VDDQ	0.51 × VDDQ	V	2, 3
VTT	Termination Voltage (System)	VREF - 0.04	VREF	VREF + 0.04	V	4

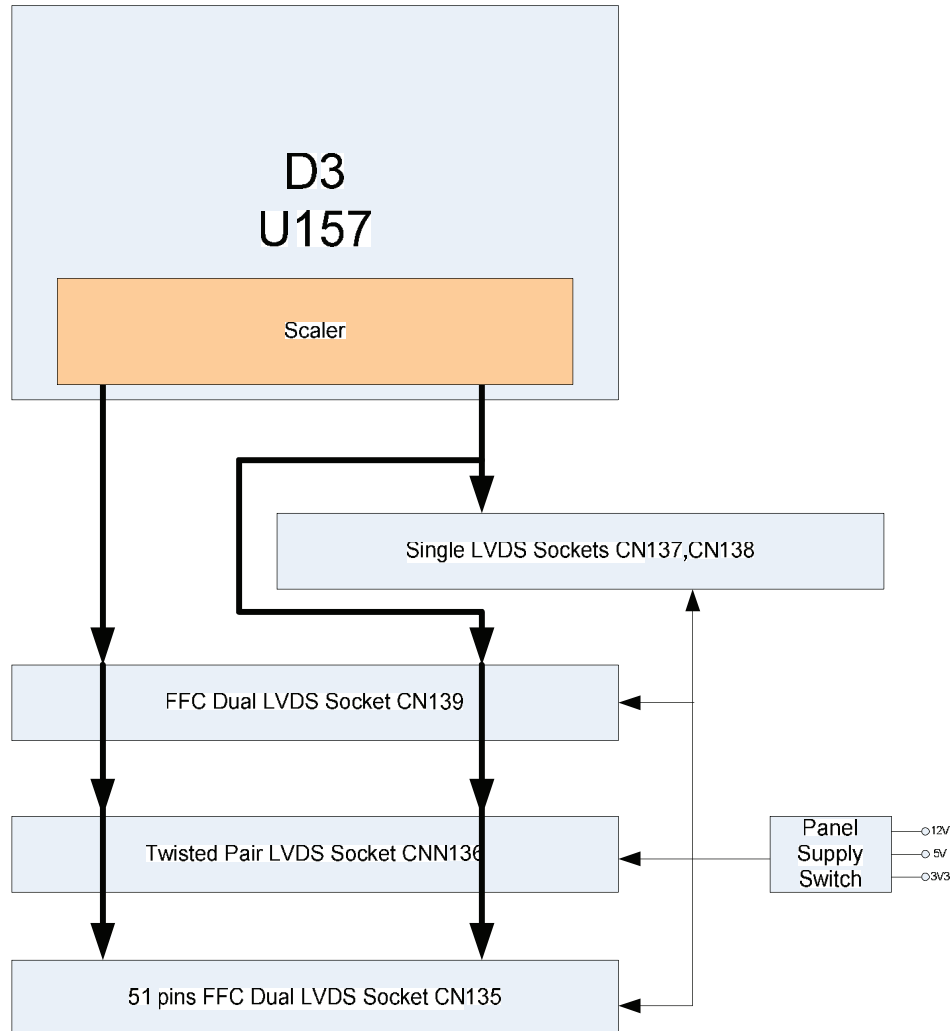
11.4 Pinning

1	2	3	4	5	6	7	8	9
VDD	NC	VSS		A		VSSQ	$\overline{\text{UDQS}}$	VDDQ
DQ14	VSSQ	UDM		B		UDQS	VSSQ	DQ15
VDDQ	DQ9	VDDQ		C		VDDQ	DQ8	VDDQ
DQ12	VSSQ	DQ11		D		DQ10	VSSQ	DQ13
VDD	NC	VSS		E		VSSQ	$\overline{\text{LDQS}}$	VDDQ
DQ6	VSSQ	LDM		F		LDQS	VSSQ	DQ7
VDDQ	DQ1	VDDQ		G		VDDQ	DQ0	VDDQ
DQ4	VSSQ	DQ3		H		DQ2	VSSQ	DQ5
VDDL	VREF	VSS		J		VSSDL	CLK	VDD
	CKE	$\overline{\text{WE}}$		K		$\overline{\text{RAS}}$	$\overline{\text{CLK}}$	ODT
NC	BA0	BA1		L		$\overline{\text{CAS}}$	$\overline{\text{CS}}$	
	A10/AP	A1		M		A2	A0	VDD
VSS	A3	A5		N		A6	A4	
	A7	A9		P		A11	A8	VSS
VDD	A12	NC		R		NC	NC	

BALL NUMBER	SYMBOL	FUNCTION	DESCRIPTION
M8,M3,M7,N2,N8,N3,N7,P2,P8,P3,M2,P7,R2	A0–A12	Address	Provide the row address for active commands, and the column address and Auto-precharge bit for Read/Write commands to select one location out of the memory array in the respective bank. Row address: A0–A12. Column address: A0–A9. (A10 is used for Auto-precharge)
L2,L3	BA0–BA1	Bank Select	BA0–BA1 define to which bank an ACTIVE, READ, WRITE or PRECHARGE command is being applied.
G8,G2,H7,H3,H1,H9,F1,F9,C8,C2,D7,D3,D1,D9,B1,B9	DQ0–DQ15	Data Input / Output	Bi-directional data bus.
K9	ODT	On Die Termination Control	ODT (registered HIGH) enables termination resistance internal to the DDR2 SDRAM.
F7,E8	LDQS, $\overline{\text{LDQS}}$	LOW Data Strobe	Data Strobe for Lower Byte: Output with read data, input with write data for source synchronous operation. Edge-aligned with read data, center-aligned with write data. LDQS corresponds to the data on DQ0–DQ7. LDQS is only used when differential data strobe mode is enabled via the control bit at EMR (1)[A10 EMRS command].
B7,A8	UDQS, $\overline{\text{UDQS}}$	UP Data Strobe	Data Strobe for Upper Byte: Output with read data, input with write data for source synchronous operation. Edge-aligned with read data, center-aligned with write data. UDQS corresponds to the data on DQ8–DQ15. UDQS is only used when differential data strobe mode is enabled via the control bit at EMR (1)[A10 EMRS command].
L8	$\overline{\text{CS}}$	Chip Select	All commands are masked when $\overline{\text{CS}}$ is registered HIGH. $\overline{\text{CS}}$ provides for external bank selection on systems with multiple ranks. $\overline{\text{CS}}$ is considered part of the command code.
K7,L7,K3	$\overline{\text{RAS}}$, $\overline{\text{CAS}}$, $\overline{\text{WE}}$	Command Inputs	$\overline{\text{RAS}}$, $\overline{\text{CAS}}$ and $\overline{\text{WE}}$ (along with $\overline{\text{CS}}$) define the command being entered.
B3,F3	UDM LDM	Input Data Mask	DM is an input mask signal for write data. Input data is masked when DM is sampled high coincident with that input data during a Write access. DM is sampled on both edges of DQS. Although DM pins are input only, the DM loading matches the DQ and DQS loading.
J8,K8	CLK, $\overline{\text{CLK}}$	Differential Clock Inputs	CLK and $\overline{\text{CLK}}$ are differential clock inputs. All address and control input signals are sampled on the crossing of the positive edge of CLK and negative edge of $\overline{\text{CLK}}$. Output (read) data is referenced to the crossings of CLK and $\overline{\text{CLK}}$ (both directions of crossing).
K2	CKE	Clock Enable	CKE (registered HIGH) activates and CKE (registered LOW) deactivates clocking circuitry on the DDR2 SDRAM.
J2	VREF	Reference Voltage	VREF is reference voltage for inputs.
A1,E1,J9,M9,R1	VDD	Power Supply	Power Supply: 1.8V ± 0.1V.
A3,E3,J3,N1,P9	VSS	Ground	Ground.
A9,C1,C3,C7,C9,E9,G1,G3,G7,G9	VDDQ	DQ Power Supply	DQ Power Supply: 1.8V ± 0.1V.
A7,B2,B8,D2,D8,E7,F2,F8,H2,H8	VSSQ	DQ Ground	DQ Ground. Isolated on the device for improved noise immunity.
A2,E2,L1,R3,R7,R8	NC	No Connection	No connection.
J7	VSSDL	DLL Ground	DLL Ground.
J1	VDDL	DLL Power Supply	DLL Power Supply: 1.8V ± 0.1V.

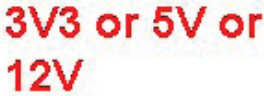
12. SCALER AND LVDS SOCKETS

12.1 LVDS sockets Block Diagram



12.2 Panel Supply Switch Circuit

This switch is used to open and close panel supply of TCON. It is controlled by port of main μ Controller. Also with this circuit panel sequence could be adjusted correctly. 3 panel supplies are connected to this circuit. All of them are optional according to panels.



13. NAND FLASH MEMORY - MX25L1005 (U158)

13.1 General Description

MX25L1005 is a CMOS 1,048,576 bit serial Flash memory, which is configured as 131,072 x 8 internally. The MX25L1005 feature a serial peripheral interface and software protocol allowing operation on a simple 3-wire bus. The three bus signals are a clock input (SCLK), a serial data input (SI), and a serial data output (SO). SPI access to the device is enabled by CS# input. The MX25L1005 provide sequential read operation on whole chip. After program/erase command is issued, auto program/ erase algorithms which program/ erase and verify the specified page or sector/block locations will be executed. Program command is executed on page (256 bytes) basis, and erase command is executes on chip or sector(4K-bytes) or block(64K-bytes). To provide user with ease of interface, a status register is included to indicate the status of the chip. The status read command can be issued to detect completion status of a program or erase operation via WIP bit. When the device is not in operation and CS# is high, it is put in standby mode and draws less than 10uA DC current. The MX25L1005 utilize MXIC's proprietary memory cell, which reliably stores memory contents even after 100,000 program and erase cycles.

13.2 Features

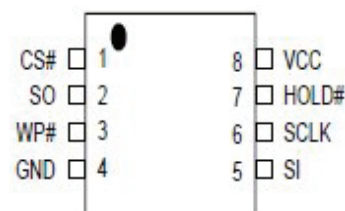
- Serial Peripheral Interface (SPI) compatible -- Mode 0 and Mode 3
- 1,048,576 x 1 bit structure
- 32 Equal Sectors with 4K byte each, Any Sector can be erased individually
- 2 Equal Blocks with 64K byte each, Any Block can be erased individually
- Single Power Supply Operation
- 2.7 to 3.6 volt for read, erase, and program operations
- Latch-up protected to 100mA from -1V to Vcc +1V
- Low Vcc write inhibit is from 1.5V to 2.5V

13.3 Absolute Maximum Ratings

RATING	VALUE
Ambient Operating Temperature	0°C to 70°C
Storage Temperature	-55°C to 125°C
Applied Input Voltage	-0.5v to 4.6v
Applied Output Voltage	-0.5v to 4.6v
VCC to Ground Potential	-0.5v to 4.6v

13.4 Pinning

8-PIN SOP (150mil)



SYMBOL	DESCRIPTION
CS#	Chip select
SI	Serial Data Input
SO	Serial Data Output
SCLK	Clock Input
HOLD#	Hold, to pause the device without deselecting the device
VCC	+3.3v Power Supply
GND	Ground

14. NAND FLASH MEMORY – NAND512XXA2C (U162)

14.1 General Description

The NAND flash 528-byte/ 264-word page is a family of non-volatile flash memories that uses the single level cell (SLC) NAND technology. It is referred to as the small page family.

The NAND512R3A2C, NAND512R4A2C, and NAND512W3A2C have a density of 512 Mbits and operate with either a 1.8 V or 3 V voltage supply. The size of a page is either 528 bytes (512 + 16 spare) or 264 words (256 + 8 spare) depending on whether the device has a x8 or x16 bus width.

The address lines are multiplexed with the Data Input/output signals on a multiplexed x8 or x16 input/output bus. This interface reduces the pin count and makes it possible to migrate to other densities without changing the footprint.

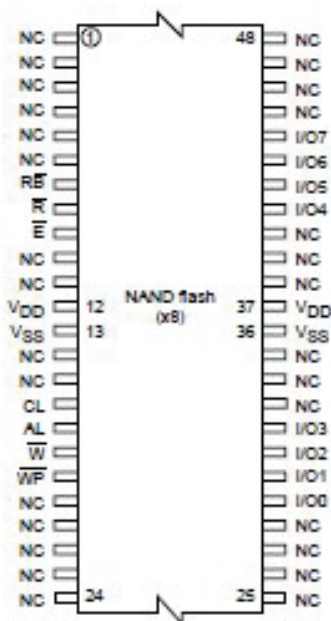
To extend the lifetime of NAND flash devices it is strongly recommended to implement an error correction code (ECC). The use of ECC correction allows to achieve up to 100,000 program/erase cycles for each block. A write protect pin is available to give a hardware protection against program and erase operations.

14.2 Features

- High density NAND flash memories
 - 512-Mbit memory array
 - Cost effective solutions for mass storage applications
- NAND interface
 - x8 or x16 bus width
 - Multiplexed address/ data
- Supply voltage: 1.8 V, 3 V
- Page size
 - x8 device: (512 + 16 spare) bytes
 - x16 device: (256 + 8 spare) words
- Block size
 - x8 device: (16K + 512 spare) bytes
 - x16 device: (8K + 256 spare) words
- Page read/program
 - Random access: 12 μ s (3 V)/15 μ s (1.8 V) (max)
 - Sequential access: 30 ns (3 V)/50 ns (1.8 V) (min)
 - Page program time: 200 μ s (typ)
 - Copy back program mode
 - Fast block erase: 2 ms (typ)
 - Status register

- Electronic signature
- Chip Enable 'don't care'
- Security features
 - OTP area
- Serial number (unique ID) option
- Hardware data protection
 - Program/erase locked during power transitions
- Data integrity
 - 100,000 program/erase cycles (with ECC)
 - 10 years data retention
- RoHS compliant packages
- Development tools
 - Error correction code models
 - Bad blocks management and wear leveling algorithms

14.3 Pinning



15. USB2.0 to Fast Ethernet – ASIX AX88X72A (U171)

15.1 General Description

The AX88772A/AX88172A Low-pin-count USB 2.0 to 10/100M Fast Ethernet controller is a high performance and highly integrated ASIC which enables low cost, small form factor, and simple plug-and-play Fast Ethernet network connection capability for desktops, notebook PC's, Ultra-Mobile PC's, docking stations, game consoles, digital-home appliances, and any embedded system using a standard USB port.

The AX88772A/AX88172A features a USB interface to communicate with a USB Host Controller and is compliant with USB specification V1.1 and V2.0. The AX88772A/AX88172A implements 10/100Mbps Ethernet LAN function based on IEEE802.3, and IEEE802.3u standards with 24KB of embedded SRAM for packet buffering. The AX88772A/AX88172A integrates an on-chip 10/100Mbps Ethernet PHY to simplify system design.

The AX88172A provides an optional External Media Interface (EMI) for external PHY or external MAC for different application purposes. The EMI can be a media-independent interface (MII) for implementing 100BASE-FX Ethernet or HomePNA functions. The EMI can also be a Reverse-MII or Reverse Reduced-MII (Reverse-RMII) for glueless MAC-to-MAC connections to any MCU with Ethernet MAC MII or RMII interface. In addition, the EMI can be configured to Dual-PHY mode allowing AX88172A to act as an Ethernet PHY or USB 2.0 PHY for external MAC device that needs Ethernet and USB interfaces in their system applications. The optional serial interface such as I2C, SPI, and UART are provided as a control channel from the USB Host Controller to communicate with the external MCU chip.

15.2 Features

Single chip USB 2.0 to 10/100M Fast Ethernet controller - AX88772A

USB Device Interface

- Integrates on-chip USB 2.0 transceiver and SIE compliant to USB Spec 1.1 and 2.0
- Supports USB Full and High Speed modes with Bus-Power or Self-Power capability
- Supports 4 or 6 programmable endpoints on USB interface
- High performance packet transfer rate over USB bus using proprietary burst transfer mechanism
- Supports USB to Ethernet bridging or vice versa in hardware

Fast Ethernet Controller

- Integrates 10/100Mbps Fast Ethernet MAC/PHY
- IEEE 802.3 10BASE-T/100BASE-TX compatible
- Supports twisted pair crossover detection and auto-correction (HP Auto-MDIX)
- Embedded 16KB SRAM for RX packet buffering and 8KB SRAM for TX packet buffering
- Supports both Full-duplex with flow control and
- Half-duplex with backpressure operation
- Supports 2 VLAN ID filtering, received VLAN Tag (4 bytes) can be stripped off or preserved
- MAC/PHY loop-back diagnostic capability

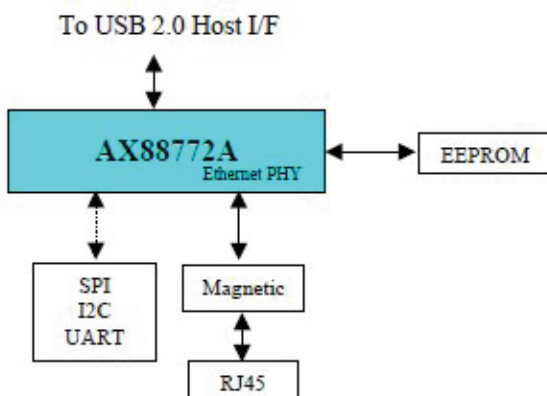
Support Wake-on-LAN Function

- Supports Suspend Mode and Remote Wakeup via Link-up, Magic packet, MS wakeup frame and external pin
- Optional PHY power down during Suspend Mode

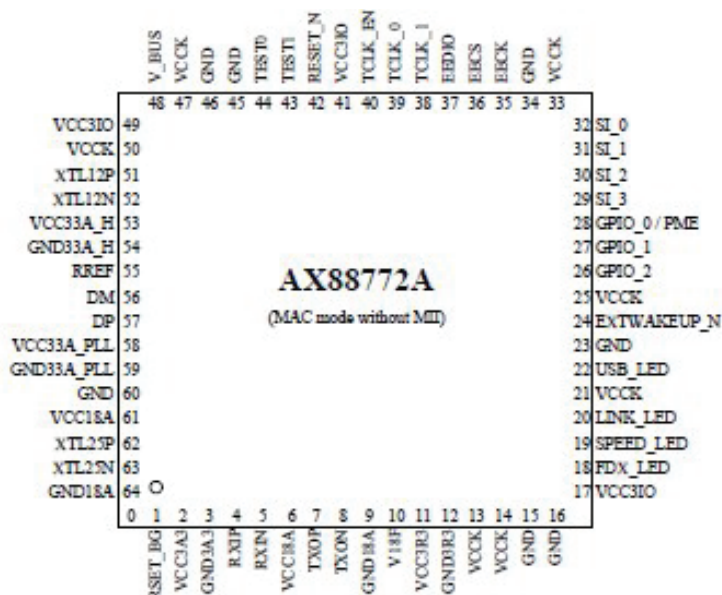
Versatile External Media Interface

- Optional MII interface in MAC mode allows AX88172A to work with external 100BASE-FX Ethernet PHY or HomePNA PHY
- Optional Reverse-MII or Reverse-RMII interface in PHY mode allows AX88172A to work with external HomePlug PHY or glueless MAC-to-MAC connections
- Optional Reverse-MII interface in Dual-PHY mode allows AX88172A to act as an Ethernet PHY or USB 2.0 PHY for external MAC device that needs Ethernet and USB in system application
- Supports 256/512 bytes (93c56/93c66) of serial EEPROM (for storing USB Descriptors)
- Supports automatic loading of Ethernet ID, USB Descriptors and Adapter Configuration from EEPROM after power-on initialization
- Provides optional serial interface, I2C, SPI and UART
- Integrates on-chip voltage regulator and only requires a single 3.3V power supply
- 12MHz and 25Mhz clock input from either crystal or oscillator source
- Integrates on-chip power-on reset circuit

15.3 Block Diagram



15.4 Pinning



16. LM1117(U175, U180, U181)

16.1 General Description

The LM1117 is a series of low dropout voltage regulators with a dropout of 1.2V at 800mA of load current. It has the same pin-out as National Semiconductor's industry standard LM317. The LM1117 is available in an adjustable version, which can set the output voltage from 1.25V to 13.8V with only two external resistors. In addition, it is also available in five fixed voltages, 1.8V, 2.5V, 2.85V, 3.3V, and 5V. The LM1117 offers current limiting and thermal shutdown. Its circuit includes a zener trimmed band-gap

reference to assure output voltage accuracy to within $\pm 1\%$. The LM1117 series is available in SOT- 223, TO-220, and TO-252 D-PAK packages. A minimum of 10 μ F tantalum capacitor is required at the output to improve the transient response and stability.

16.2 Features

- Available in 1.8V, 2.5V, 2.85V, 3.3V, 5V, and Adjustable Versions
- Space Saving SOT-223 Package
- Current Limiting and Thermal Protection
- Output Current 800mA
- Line Regulation 0.2% (Max)
- Load Regulation 0.4% (Max)
- Temperature Range
- LM1117 0°C to 125°C
- LM1117I -40°C to 125°C

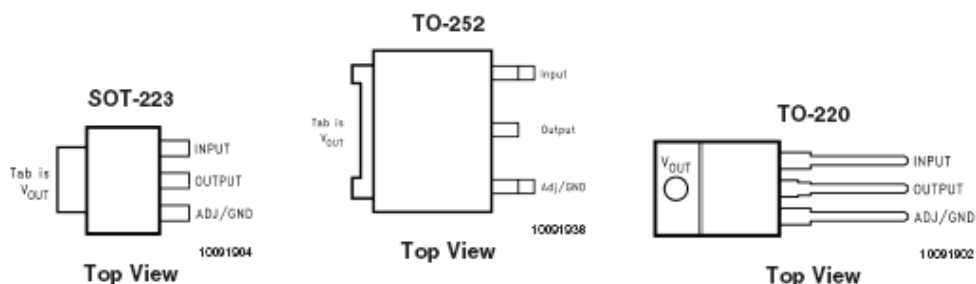
16.3 Applications

- 2.85V Model for SCSI-2 Active Termination
- Post Regulator for Switching DC/DC Converter
- High Efficiency Linear Regulators 15
- 32" TFT TV Service Manual 10/01/2005
- Battery Charger
- Battery Powered Instrumentation

16.4 Absolute Maximum Ratings

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
DC Input Voltage	V_{IN}		7	V
Lead Temperature (Soldering, 5 Seconds)	T_{SOL}		260	°C
Storage Temperature Range	T_{STG}	-65	150	°C
Operating Junction Temperature Range	T_{OPR}	0	125	°C

16.5 Pinning



17. MP2012 (U176)

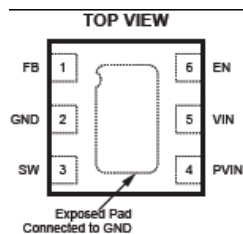
17.1 General Description

The MP2012 is a fully integrated, internally compensated 1.2MHz fixed frequency PWM step-down converter. It is ideal for powering portable equipment that runs from a single cell Lithium-Ion (Li+) Battery, with an input range from 2.7V to 6V. The MP2012 can provide up to 1.5A of load current with output voltage as low as 0.8V. It can also operate at 100% duty cycle for low dropout applications. With peak current mode control and internal compensation, the MP2012 is stable with ceramic capacitors and small inductors. Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown.

17.2 Features

- 2.7-6V Input Operation Range
- Output Adjustable from 0.8V to VIN
- 1µA Max Shutdown Current.
- Up to 95% Efficiency
- 100% Duty Cycle for Low Dropout
- Applications
- 1.2MHz Fixed Switching Frequency
- Stable with Low ESR Output Ceramic
- Capacitors
- Thermal Shutdown
- Cycle-by-Cycle Over Current Protection
- Short Circuit Protection
- Available in 6-pin 3x3mm QFN

17.3 Pinning



Pin #	Name	Description
1	FB	Feedback input. An external resistor divider from the output to GND, tapped to the FB pin sets the output voltage.
2	GND, Exposed Pad	Ground pin. Connect exposed pad to ground plane for proper thermal performance.
3	SW	Switch node to the inductor.
4	PVIN	Input supply pin for power FET.
5	VIN	Input Supply pin for controller. Put small decoupling ceramic near this pin.
6	EN	Enable input, "High" enables MP2012. EN is pulled to GND with 1Meg internal resistor.

18. RTA8283A (U23, U173)

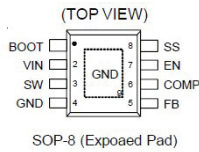
18.1 General Description

The RT8283A is a high-efficiency, monolithic synchronous step-down DC/DC converter that can deliver up to 3A output current from a 4.5V to 23V input supply. The RT8283A's current mode architecture and external compensation allow the transient response to be optimized over a wide range of loads and output capacitors. Cycle-by-cycle current limit provides protection against shorted outputs and soft-start eliminates input current surge during start-up. The RT8283A also provides output under voltage protection and thermal shutdown protection. The low current ($<3\mu\text{A}$) shutdown mode provides output disconnect, enabling easy power management in battery powered systems. The RT8283A is available in a SOP-8 package.

18.2 Features

- $\pm 1.5\%$ High Accuracy Feedback Voltage
- Integrated N-MOSFET Switches
- Current Mode Control
- Fixed Frequency Operation : 340kHz
- Output Adjustable from 0.8V to 20V
- Up to 95% Efficiency
- Thermal Shutdown Protection

18.3 Pinning



Pin No.	Pin Name	Description
1	BOOT	Bootstrap for high-side gate driver. Connect a 0.1 μ F or greater ceramic capacitor from BOOT to SW pins.
2	VIN	Input Supply 4.5V to 23V. Must bypass with a suitably large ceramic capacitor.
3	SW	Phase Node--Connect to external L-C filter..
4, 9 (Exposed Pad)	GND	Ground.
5	FB	Feedback Input pin is connected to the converter output. It is used to set the output of the converter to regulate to the desired value via an internal res divider. For an adjustable output, an external res divider is connected to this pin.
6	COMP	Compensation Node. COMP is used to compensate the regulation Control loop. Connect a series RC network from COMP to GND. In some cases, an additional capacitor from COMP to GND is required.
7	EN	Enable Input Pin. Logic high enables the converter; a logic low forces the RT8253A into shutdown mode. Attach this pin to VIN with a 100k Ω pull up resistor for automatic startup.
8	SS	Soft-Start Control Input. SS controls the soft-start period. Connect a capacitor from SS to GND to set the soft-start period. A 0.1 μ F capacitor sets the soft-start period to 13.5ms.

19. MP1583 (U174)

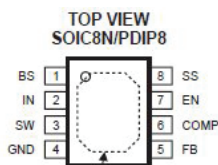
19.1 General Description

The MP1583 is a step-down regulator with a built-in internal Power MOSFET. It achieves 3A of continuous output current over a wide input supply range with excellent load and line regulation. Current mode operation provides fast transient response and eases loop stabilization. Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown. An adjustable soft-start reduces the stress on the input source at start-up. The MP1583 requires a minimum number of external components, providing a compact solution.

19.2 Features

- 3A Output Current
- Programmable Soft-Start
- 100mΩ Internal Power MOSFET Switch
- Stable with Low ESR Output Ceramic Capacitors
- Up to 95% Efficiency
- 20μA Shutdown Mode
- Fixed 385KHz Frequency
- Thermal Shutdown
- Cycle-by-Cycle Over Current Protection
- Wide 4.75V to 23V Operating Input Range
- Output Adjustable from 1.22V to 21V
- Under-Voltage Lockout

19.3 Pinning



Pin No.	Pin Name	Description
1	BOOT	High-Side Gate Drive Bootstrap Input. BS supplies the drive for the high-side N-Channel MOSFET switch.
2	IN	Power Input. Drive IN with a 4.75V to 23V power source.
3	SW	Power Switching Out is the switching node that supplies power to the output
4	GND	Ground.
5	FB	Feedback Input. FB senses the output voltage and regulates it. Drive FB with a resistive voltage divider from the output voltage. FB threshold is 1.222V.
6	COMP	Compensation Node is used to compensate the regulation control loop.
7	EN	Enable/UVLO. A voltage greater than 2.71V enables operation. For complete low current shutdown the EN pin voltage needs to be at less than 900mV. When the voltage on EN exceeds 1.2V, the internal regulator will be enabled and the soft-start capacitor will begin to charge. The MP1583 will start switching after the EN pin voltage reaches 2.71V.
8	SS	Soft-Start Control Input. SS controls the soft-start period.

20. FDC642

20.1 General Description

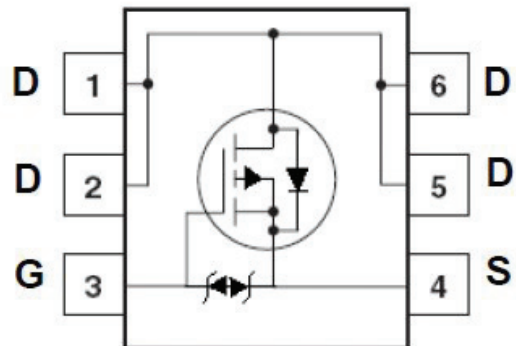
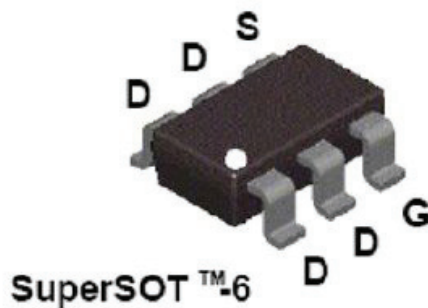
This P-Channel 2.5V specified MOSFET is produced using Fairchild's advanced PowerTrench® process that has been especially tailored to minimize on-state resistance and yet maintain low gate charge for superior switching performance.

These devices have been designed to offer exceptional power dissipation in a very small footprint for applications where the larger packages are impractical.

20.2 Features

- Max $r_{DS(on)}$ = 65 m Ω at V_{GS} = -4.5 V, I_D = -4.0 A
- Max $r_{DS(on)}$ = 100 m Ω at V_{GS} = -2.5 V, I_D = -3.2 A
- Fast switching speed
- Low gate charge (11nC typical)
- High performance trench technology for extremely low $r_{DS(on)}$
- SuperSOT™-6 package: small footprint (72% smaller than standard SO-8); low profile (1 mm thick)
- Termination is Lead-free and RoHS Compliant

20.3 Pinning



21. FDC604P

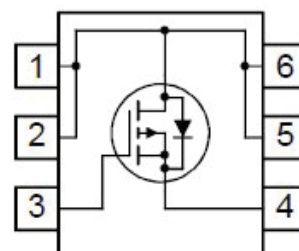
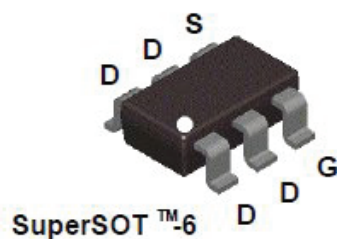
21.1 General Description

This P-Channel 1.8V specified MOSFET uses Fairchild's low voltage PowerTrench process. It has been optimized for battery power management applications.

21.2 Features

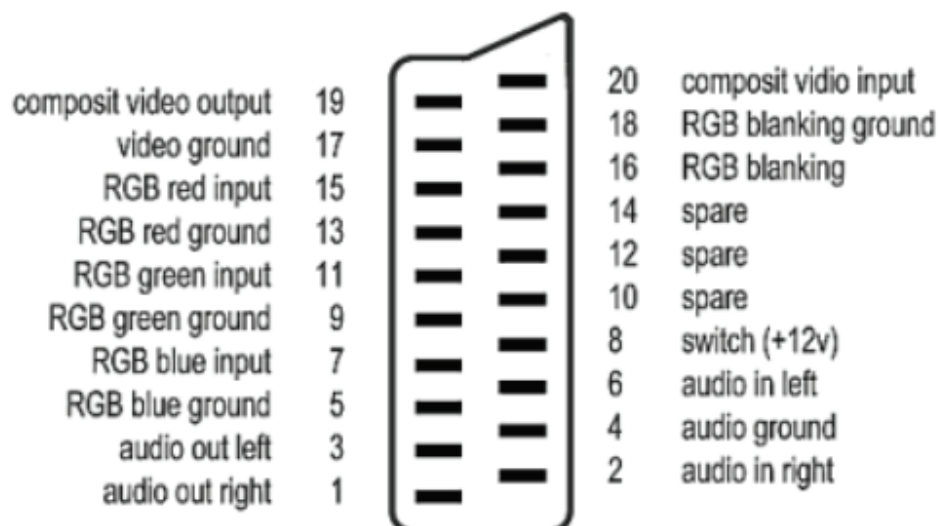
- -5.5 A, -20 V. $R_{DS(ON)} = 33\text{ m}\Omega$ @ $V_{GS} = -4.5\text{ V}$
- $R_{DS(ON)} = 43\text{ m}\Omega$ @ $V_{GS} = -2.5\text{ V}$
- $R_{DS(ON)} = 60\text{ m}\Omega$ @ $V_{GS} = -1.8\text{ V}$
- Fast switching speed.
- High performance trench technology for extremely low $R_{DS(ON)}(S)$

21.3 Pinning

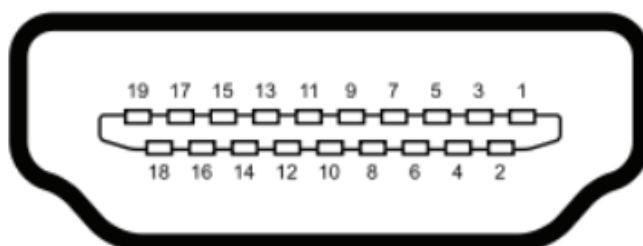


22. CONNECTORS

22.1 SCART (SC1)

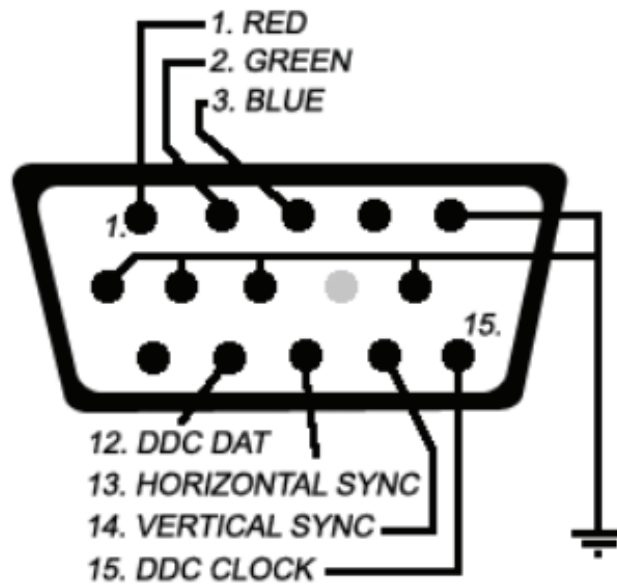


22.2 HDMI (CN707,CN708)



Pin Number	Signal Name	Pin Number	Signal Name
1	TMDS Data 2+	20	SHELL
2	TMDS Data 2 Shield	19	Hot Plug Detect
3	TMDS Data 2-	18	+5V Power
4	TMDS Data 1+	17	Ground
5	TMDS Data 1 Shield	16	DDC Data
6	TMDS Data 1-	15	DDC Clock
7	TMDS Data 0+	14	No Connect
8	TMDS Data 0 Shield	13	CEC
9	TMDS Data 0-	12	TMDS Clock-
10	TMDS Clock+	11	TMDS Clock Shield

23.3 VGA (CN132)

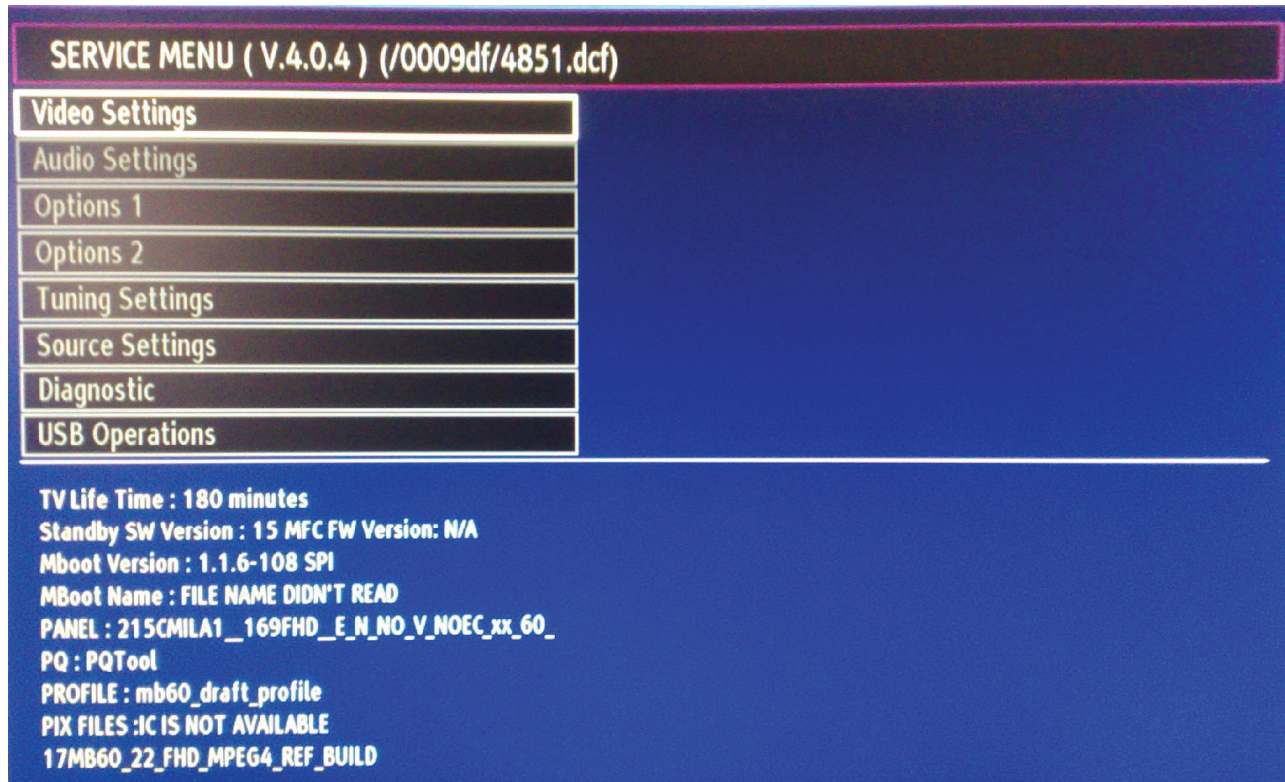


SERVICE MENU SETTINGS

23. SERVICE MENU SETTINGS

In order to reach service menu, First Press “MENU” Then press the remote control code two times, which is “4725”.

In first screen following items can be seen:



23.1 Video Settings

VIDEO SETTINGS

RF AGC SECAM	☐	3
RF AGC NEIGHBOUR NO IMAGE NO	☐	3
RF AGC NEIGHBOUR NO IMAGE YES	☐	3
RF AGC NEIGHBOUR YES IMAGE NO	☐	6
RF AGC NEIGHBOUR YES IMAGE YES	☐	6
RF AGC TEST	☐	3
ADC Calibration Source	EXT-1	
ADC Calibration R Gain	☐	84
ADC Calibration G Gain	☐	87
ADC Calibration B Gain	☐	84
ADC Calibration R Offset	☐	0
ADC Calibration G Offset	☐	0
ADC Calibration B Offset	☐	0

Back
 Exit

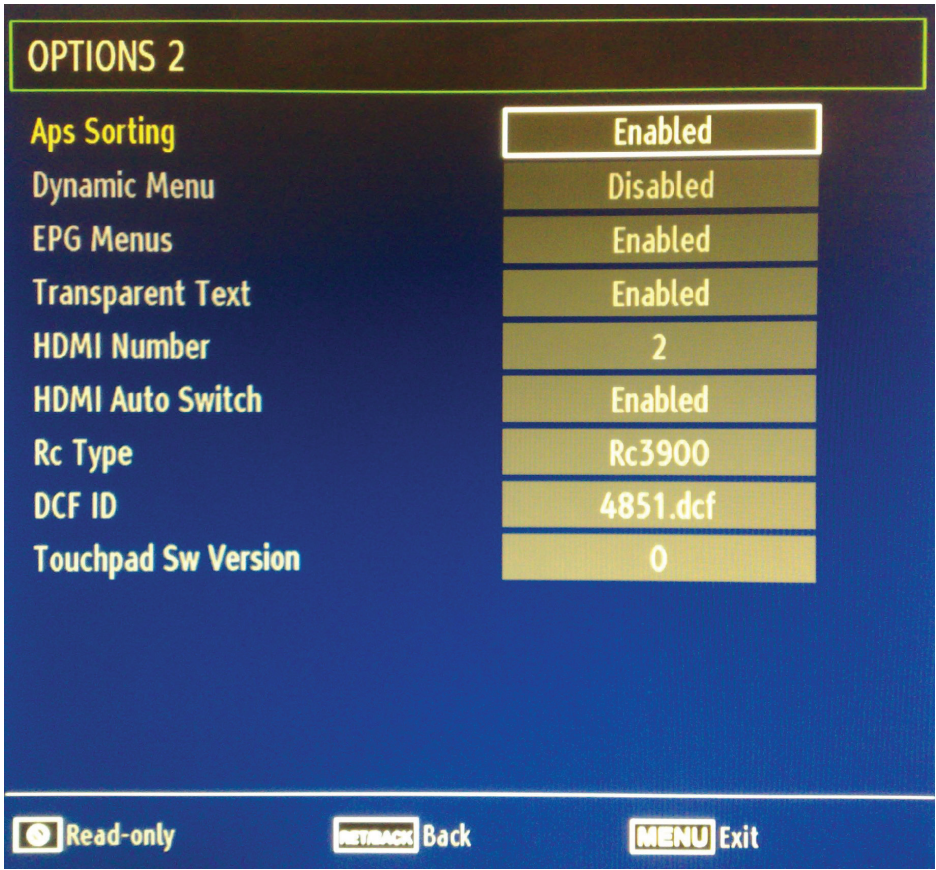
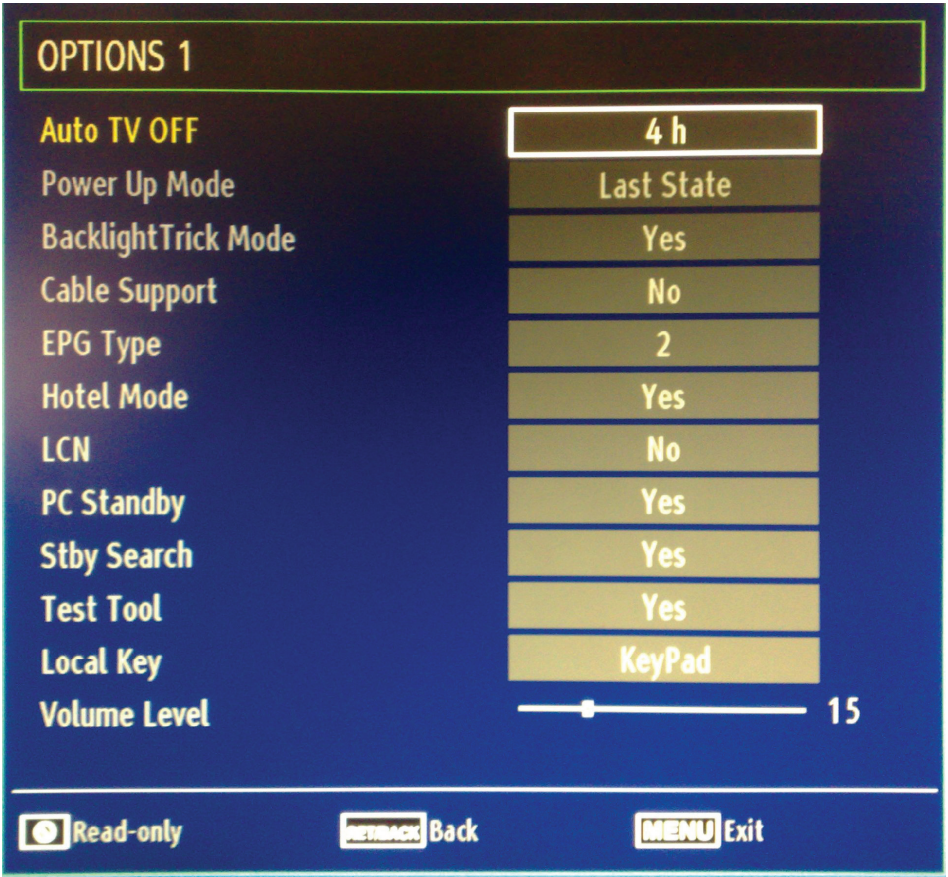
23.2 Audio Settings

AUDIO SETTINGS

Surround Type	Other
Surround Mode Text	Surround Sound

Back
 Exit

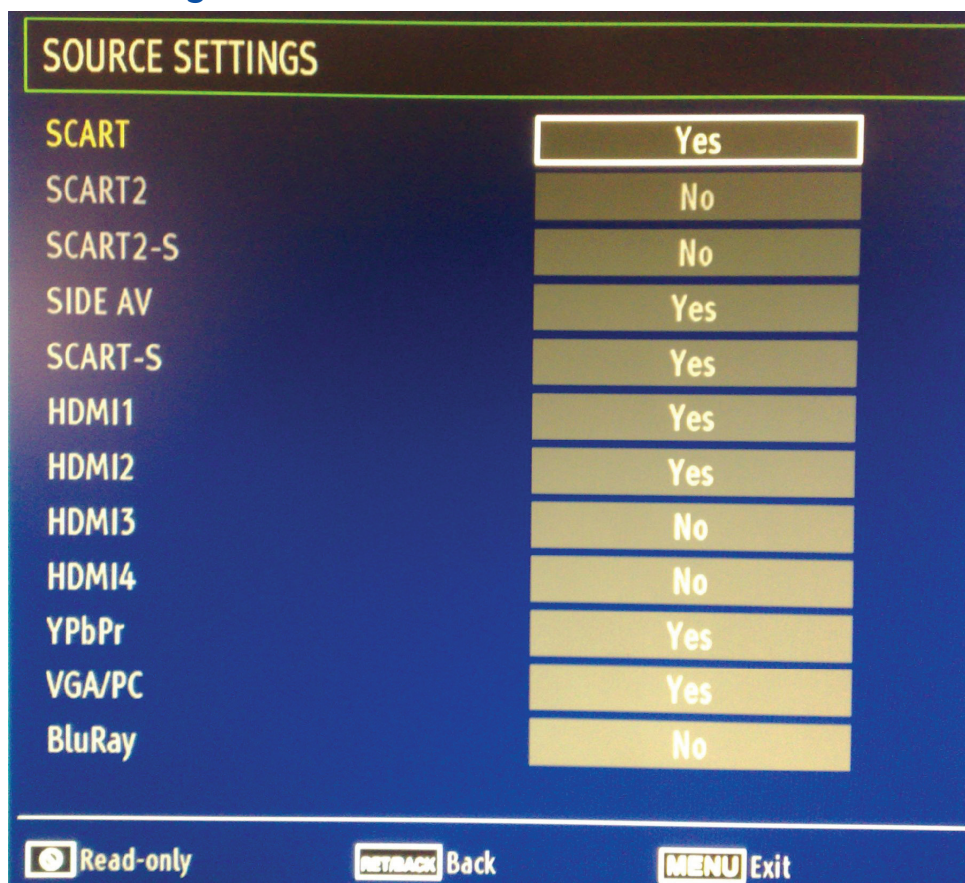
23.3 Options



23.4 Tuning Settings



23.5 Source Settings



23.6 Diagnostic



23.7 USB Operations

USB operations option cannot be used directly. It can be used for updating panel tool, hw configuration etc.

SOFTWARE UPDATE

24. Software update

Analog - Digital SW update via USB

1. Please copy the files to USB (root).
 - mb60_en.bin
 - mboot.bin
 - usb_auto_update.txt
2. Turn power to OFF by mechanical switch(rocker switch) or removing AC plug. And plug the USB to TV
3. Keep pressing OK key from remote controller and then turn the TV power to ON(by mechanical switch or by inserting the AC plug) and keep OK key pressed until the stanby led blinks rapidly(rapid blinking is faster than normal blinking)
4. When the led is started to blink rapidly, you can release the OK key.Please wait approximately for 1-2 minutes.
5. When the blinks of led is stopped, TV opens autamatically with the new SW.

25. HOTEL TV MODE

2.14.1 HOTEL TV FEATURES:

The HOTEL TV is a special mode which restricts some operations of TV. This allows the customer to use the TV in hotels or in Hospitals. The restrictions of a hotel TV are basically given below.

1. The user cannot increase the volume above a specified limit. And could set fixed volume.
2. The user could enable headphone direct volume control.
3. The user cannot reach some menus.
4. The user cannot use panel.
5. Start up source position can be limited for the user.
6. Last status could be used or not
7. Teletext could be disabled or enabled.
8. NVRAM data (like service list and user preferences, etc.) could be copied or set via USB device
9. Pin8 could be used or not

2.14.2 HOTEL TV MENU:

To enter hotel menu, please open main menu by pressing MENU(M) button. When you code following password “7935”, hidden hotel TV menu appears.

2.14.3 Hotel Mode

Setting “Hotel Mode” item 'On' activates hotel mode. In other words user can do only what he/she is allowed to do. Restriction level can be determined by using other items on menu namely Volume Limit, Panel Button, OSD Disable. In hotel mode, users can not reach channel table and install menu so they could not change any program information.

2.14.4 Last Status

Setting “Last Status” item to 'On' enable TV open with the closing status. Otherwise, if “Last Status” item is set 'Off' TV opens with *standby* status.

2.14.5 Panel Lock

Enables (Panel Lock = On) or prohibits (Panel Lock = Off) the use of front panel buttons.

2.14.6 RCU Inhibit

If OFF is selected TV will go on normal operation. If it is ON RCU will not function in any menu (including no menu) except this menu. To turn this option OFF later, “hotel TV menu shortcut” (MENU(M)-7-9-3-5) can be used to pop up this menu.

2.14.7 Startup Position

Specifies the starting channel when TV is switched ON. May take one of following values:

- AUTO (Last channel when TV is turned off)

-  TV (TV channel number 1)
-  Other enabled external sources via service menu or config tool (EXT1, HDMI2, PC, FAV, SVHS etc.)

2.14.8 Startup Channel

Specifies the starting TV channel's ID which will be tuned when startup position is TV

2.14.9 Volume Limit

Sets the maximum value the volume can have. "Volume Limit" can take values between 0-63.

2.14.10 Fixed Volume Enable

Enables (Fixed Volume Enable = On) or prohibits (Fixed Volume Enable = Off) the use of fixed volume value which is set by menu item "Fixed Volume Value". If Fixed Volume Enable is ON, volume cannot be set to a value other than the Fixed Volume Value.

2.14.11 Fixed Volume Value

Sets the fixed value the volume can have. If Fixed Volume Limit is ON, volume is set with the value here.

2.14.12 Headphone Direct Volume

Enables to could set via headphone volume dialog the headphone volume level.

If it is changed to enable then V+/- keys will change HP volume and left/right option will change speaker volume unless there is any open OSD. If it is disabled it will behave as normal.

Volume control and HP volume control are displayed by volume slider menu.

2.14.13 OSD Disable

Disables either only INSTALL menu or all menus, both in analog and digital (IDTV) mode.

OSD Disable = Disable All Menus : All menus (MAIN, SOUND, PICTURE, SETTINGS, and INSTALLATION) are invisible.

OSD Disable = Disable Setup Menus : Only SETUP menus are invisible.

Invisible Setup Menus are:

Main menu: Installation, Channel list

Settings menu: Language, parental, Sources, Other settings

2.14.14 Teletext

Enables (Teletext = On) or prohibits (Teletext = Off) the use of teletext (or MHEG if available)

2.14.15 Copy To USB

There are two steps and both are independent of each other.

Copy the updated welcome image to USB as "hotel_wel.png"

Copy NVRAM data (service list, preferences, etc.) to USB device. When Copy to USB is called, those files are copied from TV to USB. Then they can be used for various purposes testing on another TV or testing/debugging on observatory etc. Note that USB should be plugged before this operation.

2.14.16 Copy From USB

There are two steps and both are independent of each other.

If there is file named “hotel_wel.png” in directory “welcome_image”. It is copied to TV to use as welcome image.

Copy from USB device data to NVRAM. Just the reverse operation done by copy to USB call. Previously copied nvram files (Flashx.bin) are copied into TV. If there is no flash file or some of them are available on USB, the available ones are copied. If no USB is connected, nothing happens.

2.14.17 USB Option

If ON is selected TV will go on normal operation. If it is OFF USB device will not receive on none of the USB ports.

2.14.18 Fixed Pic. Mode

If OFF is selected TV will go on normal operation. If it is ON Main menu/Picture quick menu/mode and quick menu/picture zoom will be inaccessible.

2.14.19 Digital Tuner

If ON is selected TV will go on normal operation. If it is OFF TV will display “no signal” message when tuned to digital channels existing in active channel list, and digital channels will not be detected in auto or manual searches.

2.14.20 Multiple RC Support

If OFF is selected TV will go on normal operation. If it is ON RCU type (system code) that is chosen in “RCU program menu” will be used. “RCU program menu” can be opened by RETURN-1-2-3-4 shortcut.

2.14.21 Welcome message

As default behaviour a welcome message image will be displayed (if hotel mode is enabled). The image will stay on screen until user presses a key.

On the bottom side of image there is a message (OSD message) displaying “press any key”

Welcome image can be changed through USB (described in “copy from USB” section). A default welcome image is available. Welcome images are .PNG files with the resolution of 960X540.

2.14.22 Signal Lost (no signal) message

As default behaviour, if there is no signal the same welcome image is displayed. This time OSD message is “no signal”.

2.14.23 Internal Clock

If hotel mode is active a new function (add wake up timer) will be available in Settings/Timers menu. That function will open a new menu to set wake up time. After timer is saved, TV can wake up automatically on desired time.

If alarm option was selected as “on” after wake up TV will show welcome image and an alarm will be heard then any key will stop alarm and welcome image.

If alarm option was selected as “off” after wake up TV will not show welcome image and the alarm will not be activated.

There is a “wakeup time channel” option in hotel mode menu, It is used to set the channel, whose time information to be used for wakeup timer. If this option is “0” time information of the channel which is being watched when timer menu is opened, will be used. Otherwise a “please wait” message will be displayed before the menu is open and during “please wait” time information of the channel will be get. (This can take up to 30s). The “wakeup time channel” should be a digital service.

2.14.24 Pin8

If ON is selected Pin8 will go on normal operation. If It is OFF Pin8 ignored.

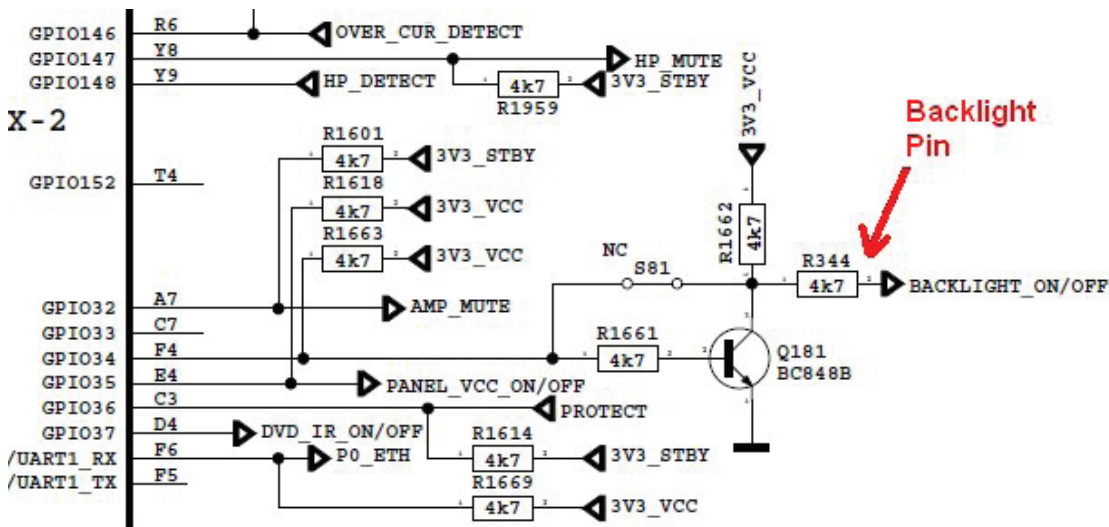
26. TROUBLESHOOTING

26.1. No Backlight Problem

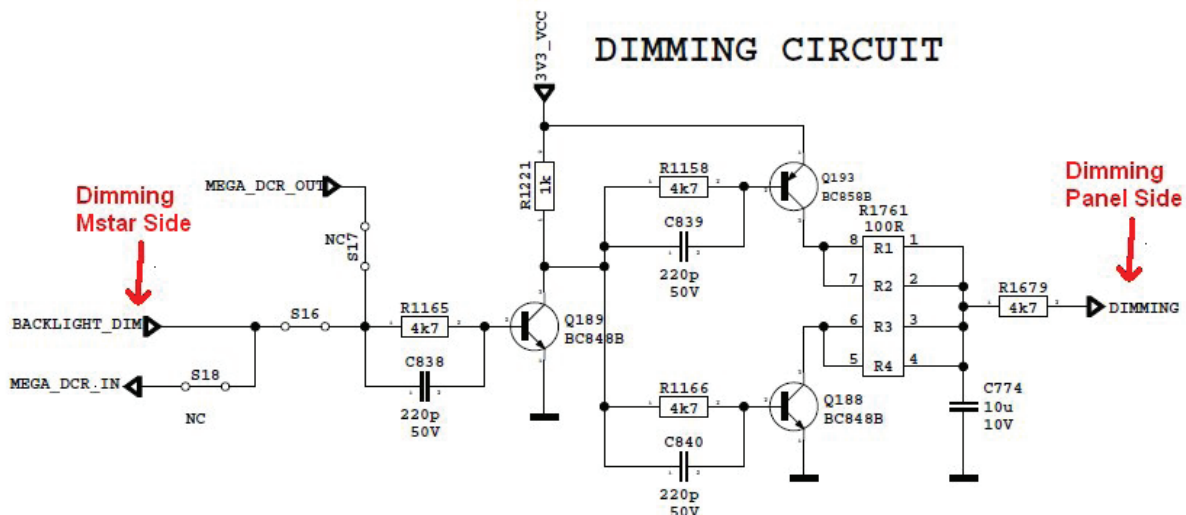
Problem: If TV is working, led is normal and there is no picture and backlight on the panel.

Possible causes: Backlight pin, dimming pin, backlight supply, stby on/off pin

Backlight pin should be high in open position. If it is low, please check Q181 and panel cables.

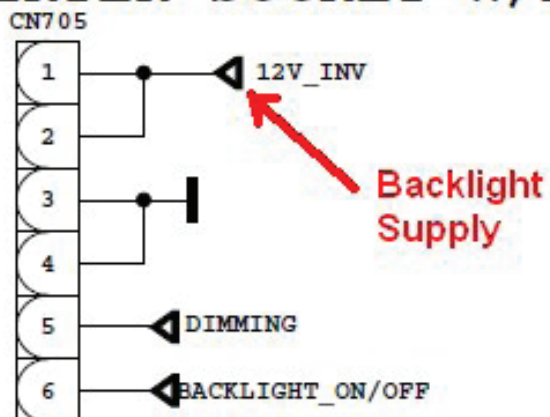


Dimming pin should be high or square wave in open position. If it is low, please check S16 for Mstar side and panel or power cables, connectors.

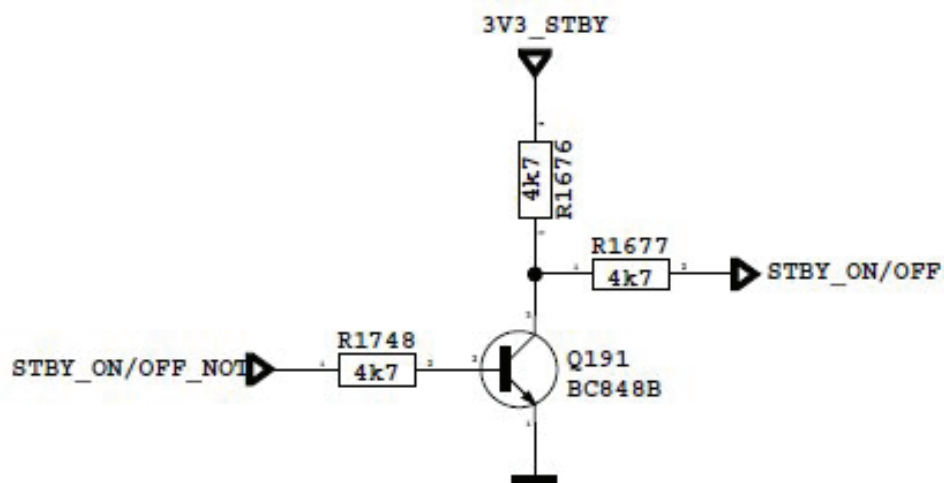


Backlight power supply should be in panel specs. Please check CN705 for MB60, related connectors for power supply cards.

INVERTER SOCKET W/ADAPTER



STBY_ON/OFF should be low for standby on condition, please check R1677.

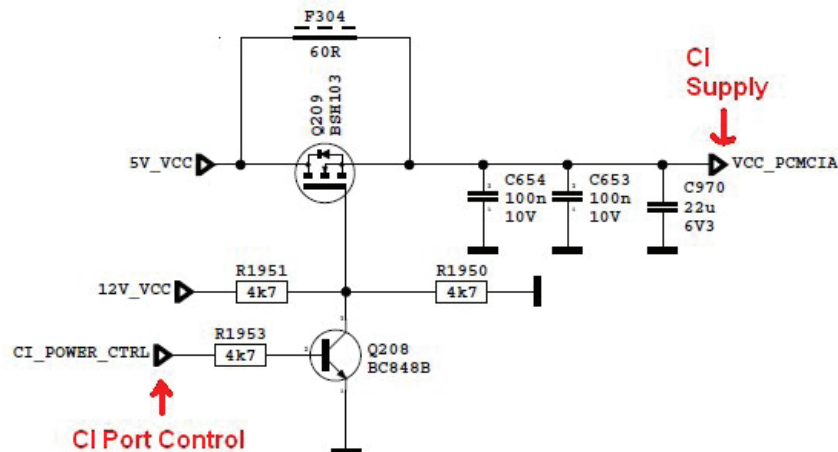


26.2. CI Module Problem

Problem: CI is not working when CI module inserted.

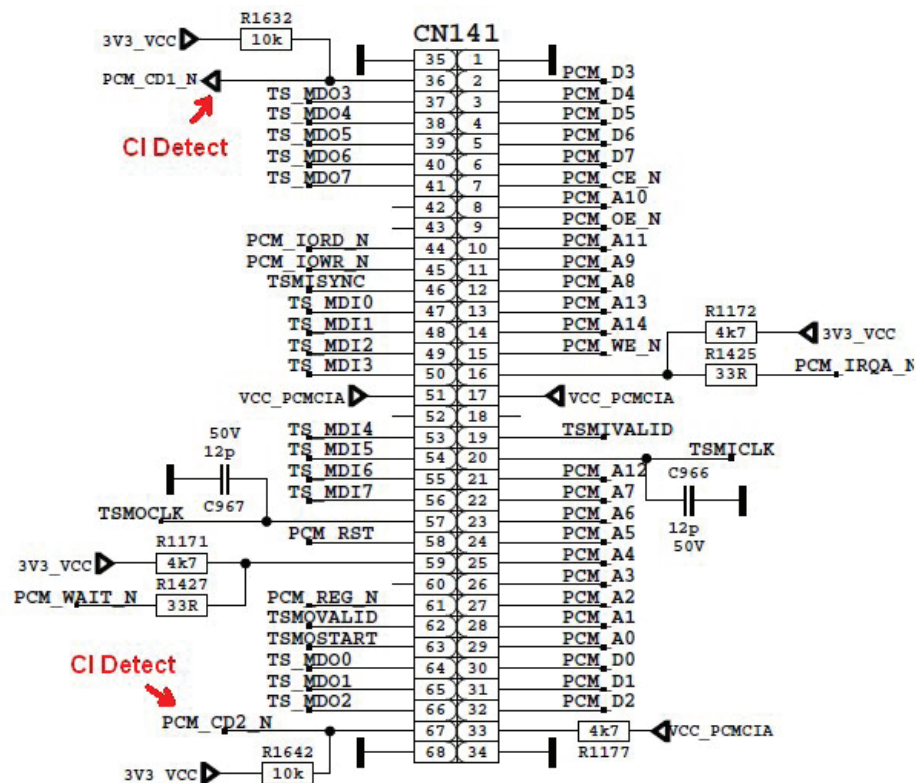
Possible causes: Supply, supply control pin, detect pins, mechanical positions of pins

CI supply should be 5V when CI module inserted. If it is not 5V please check CI_POWER_CTRL, this pin should be low.



Please check mechanical positions of CI module.

Detect ports should be low. If it is not low please check CI connector pins, CI module pins and 3V3_VCC on MB60.

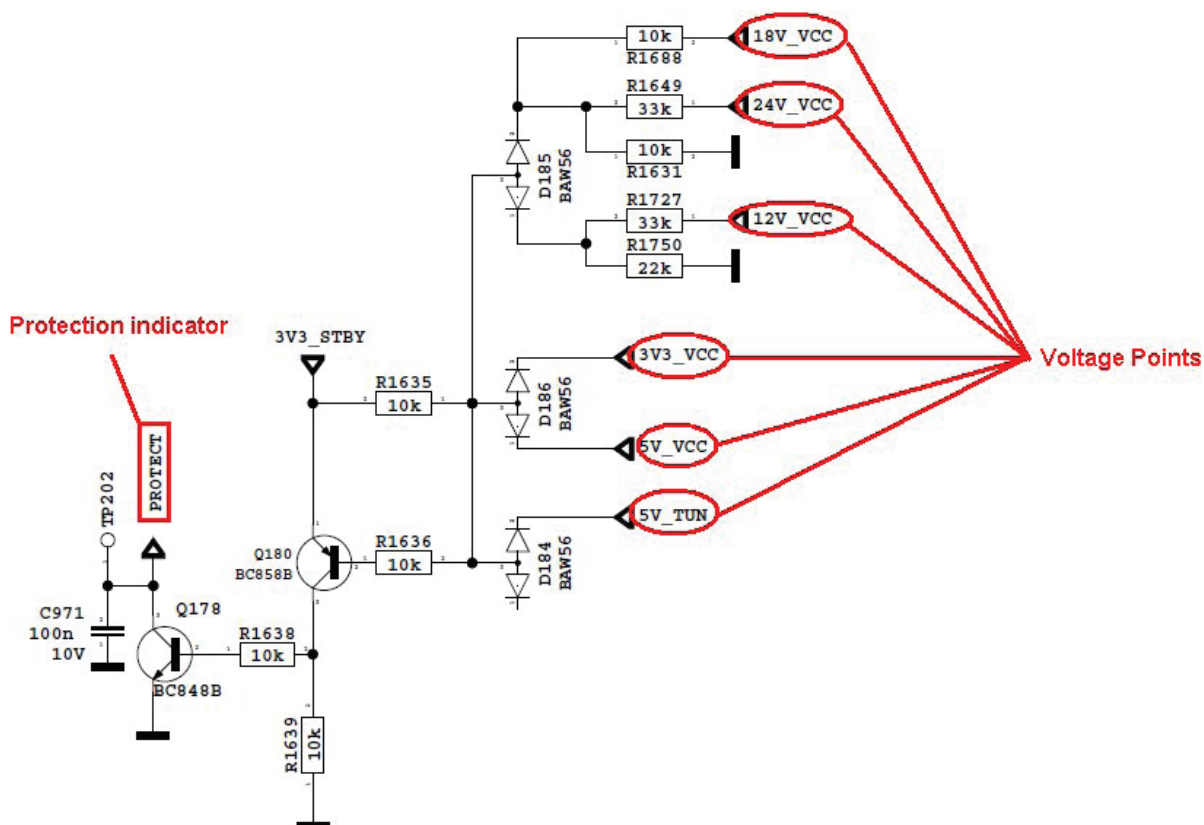


26.3. Led Blinking Problem

Problem: LED blinking, no other operation

This problem indicates a short on Vcc voltages. Protect pin should be logic high while normal operation. When there is a short circuit protect pin will be logic low. If you detect logic low on protect pin, unplug the TV set and control voltage points with a multimeter to find the shorted voltage to ground.

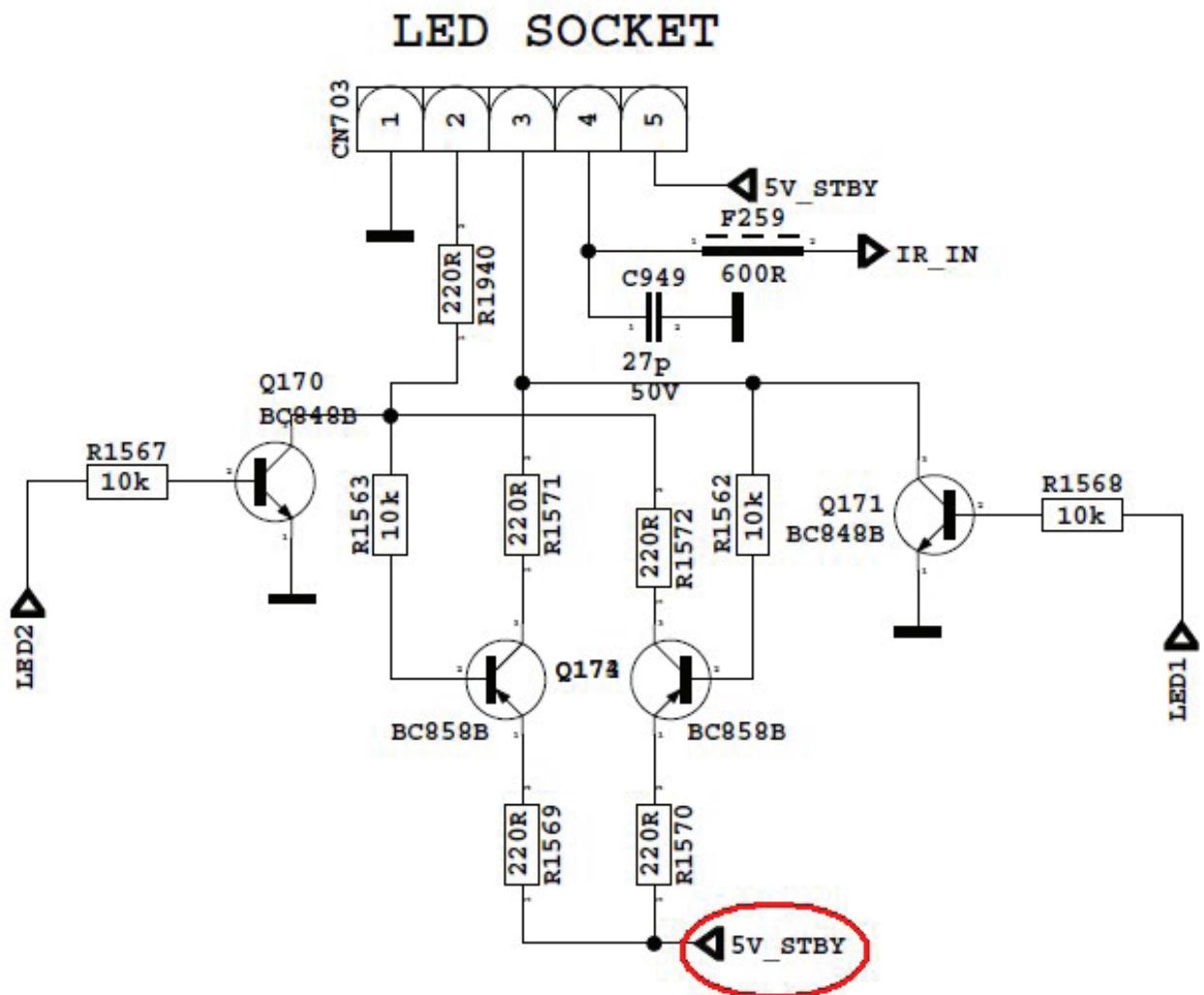
SHORT CCT PROTECTION



26.4. IR Problem

Problem: LED or IR not working

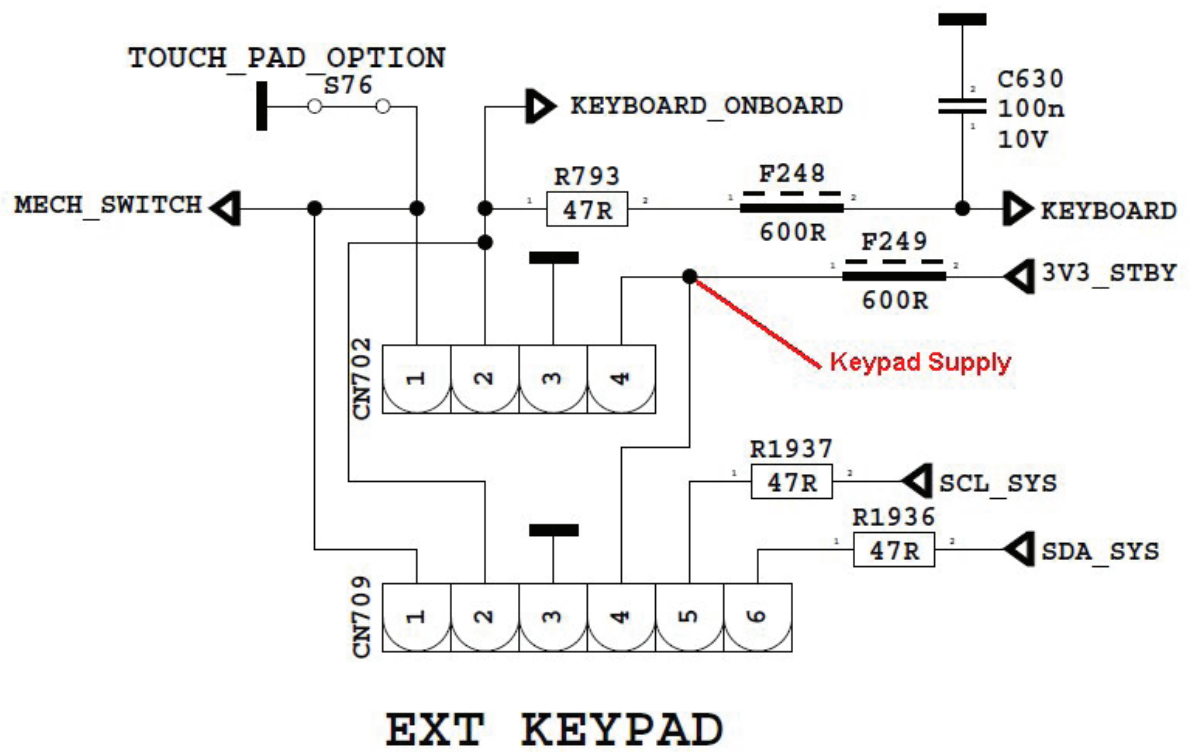
Check LED card supply on MB60 chassis.



26.5. Keypad Touchpad Problems

Problem: Keypad or Touchpad is not working

Check keypad supply and KEYBOARD pin on MB60.

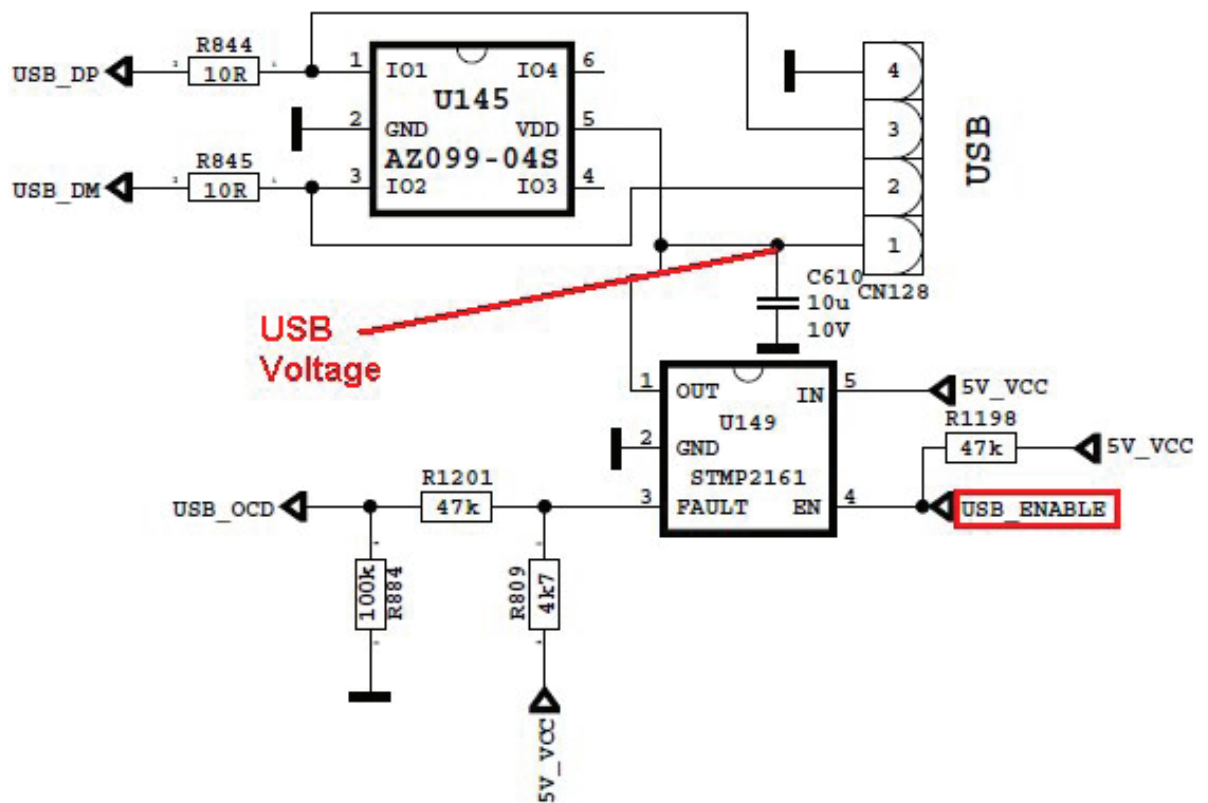


26.6. USB Problems

Problem: USB is not working or no USB Detection.

Check USB Supply, It should be nearly 5V. Also USB Enable should be logic high.

USB INTERFACE

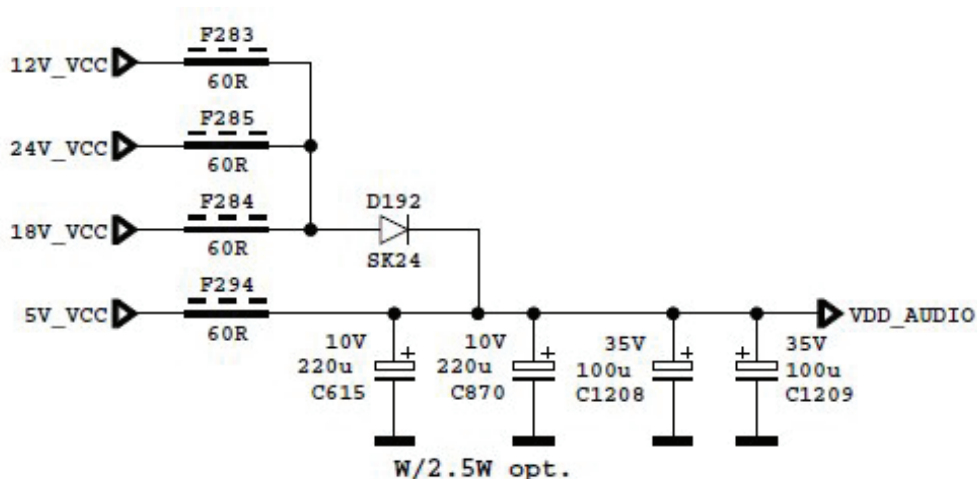


26.7. No Sound Problem

Problem: No audio at main TV speaker outputs.

Check supply voltages of VDD_AUDIO, 5V_VCC and 3V3_VCC with a voltage-meter.

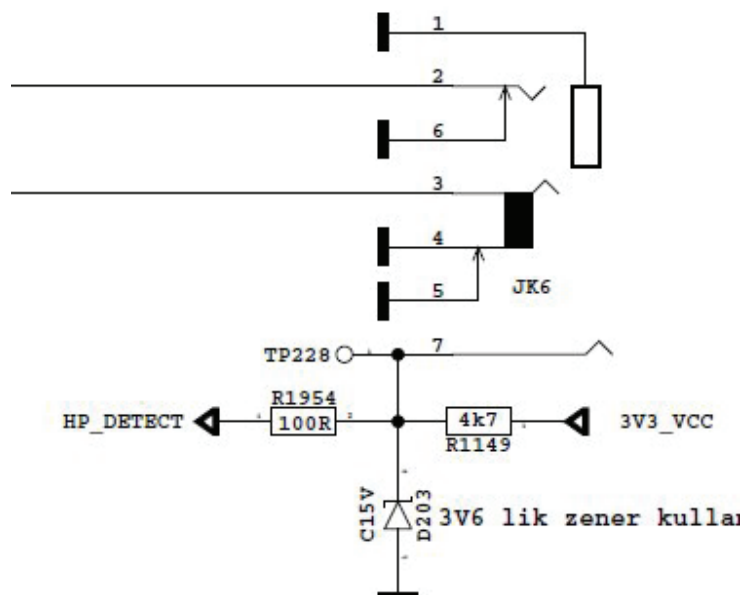
There may be a problem in headphone connector or headphone detect circuit (when headphone is connected, speakers are automatically muted). Measure voltage at HP_DETECT pin, it should be 3.3v.



26.8. No Sound Problem at Headphone

Problem: No audio at headphone output.

Check HP detect pin, when headphone is. Check 5V_VCC and 3V3_VCC with a voltage-meter.



26.9. Standby On/Off Problem

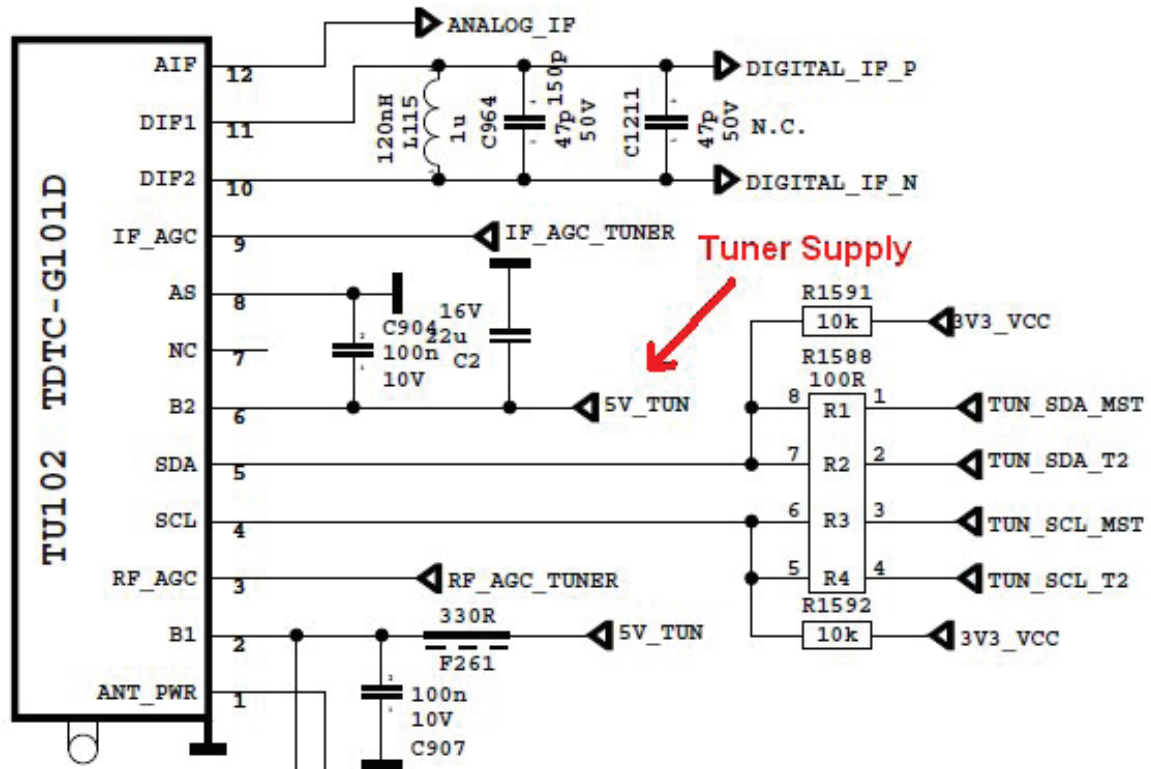
Problem: Device cannot boot, TV hangs in standby mode.

There may be a problem about power supply. Check 12V_VCC, 5V_VCC and 3V3_VCC with a voltage-meter. Also there may be a problem about SW. Try to update TV with latest SW. Additionally it is good to check SW printouts via hyper-terminal (or Teraterm). These printouts may give a clue about the problem.

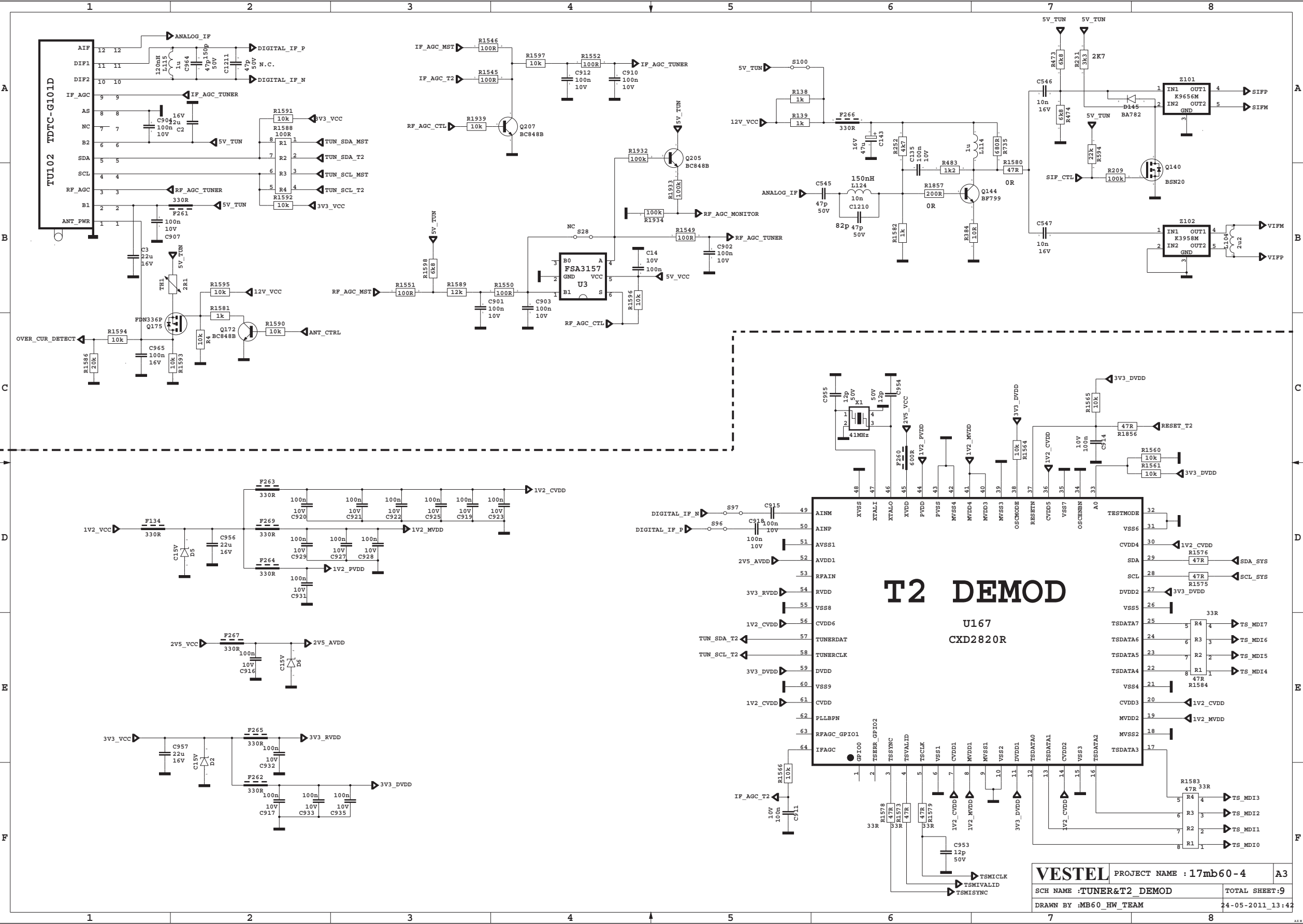
26.10 No Signal Problem

Problem: No signal in TV mode.

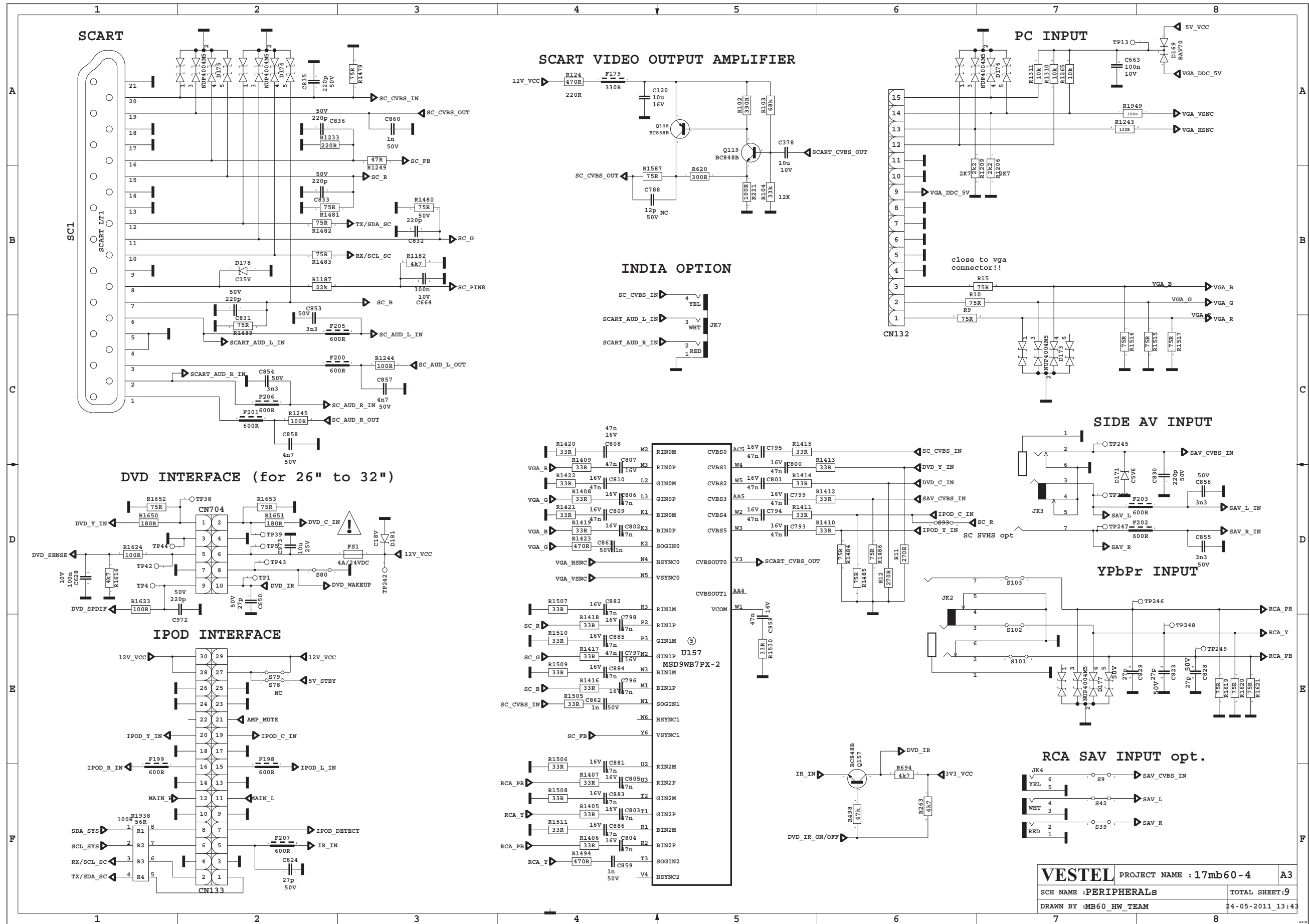
Check tuner supply voltage; 5V_TUN. Check tuner options are correctly set in Service menu. Check AGC voltage at RF_AGC pin of tuner.



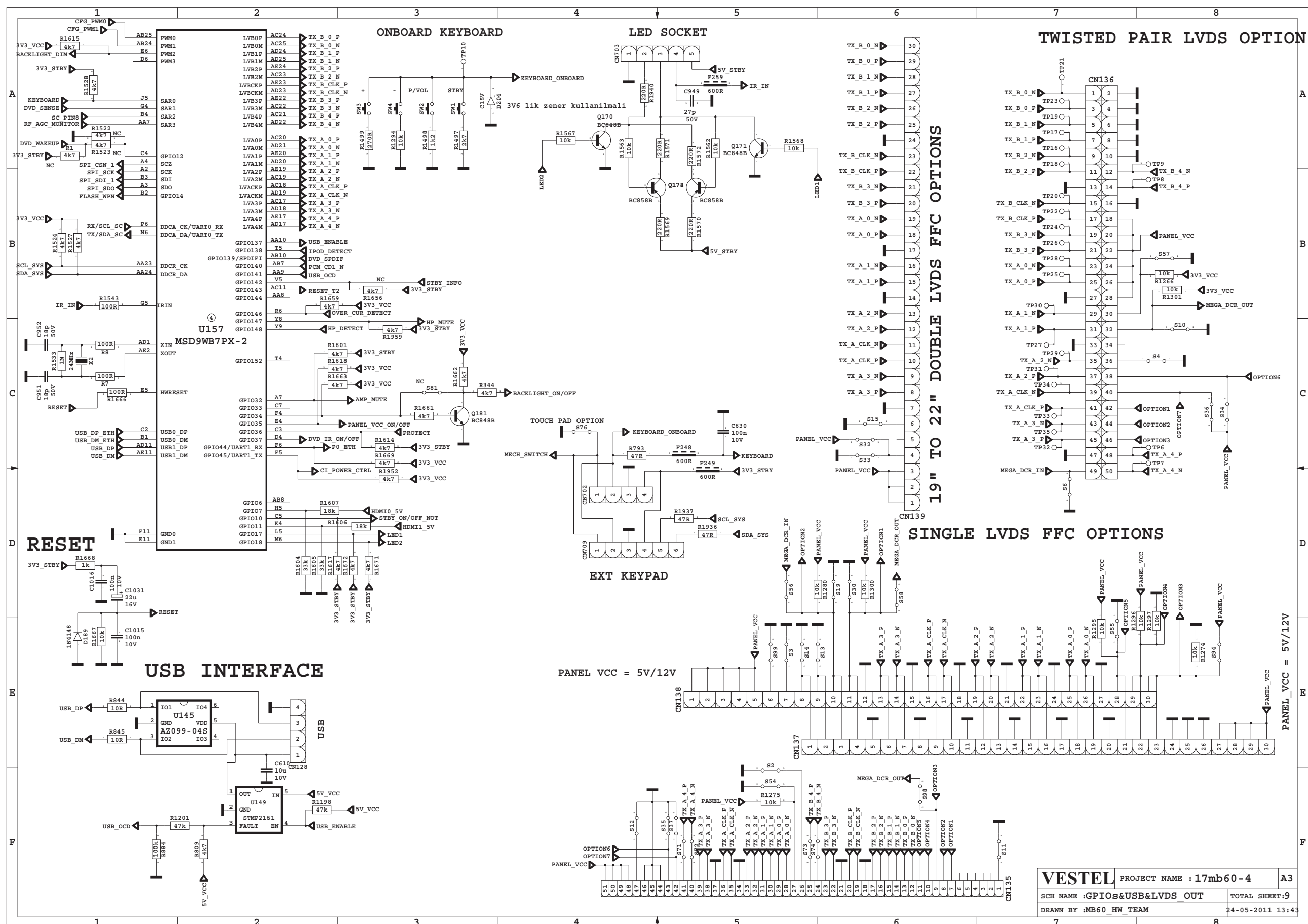
SCHEMATIC DIAGRAMS
27. Schematic Diagrams
Tuner & T2 Demodulator Diagram



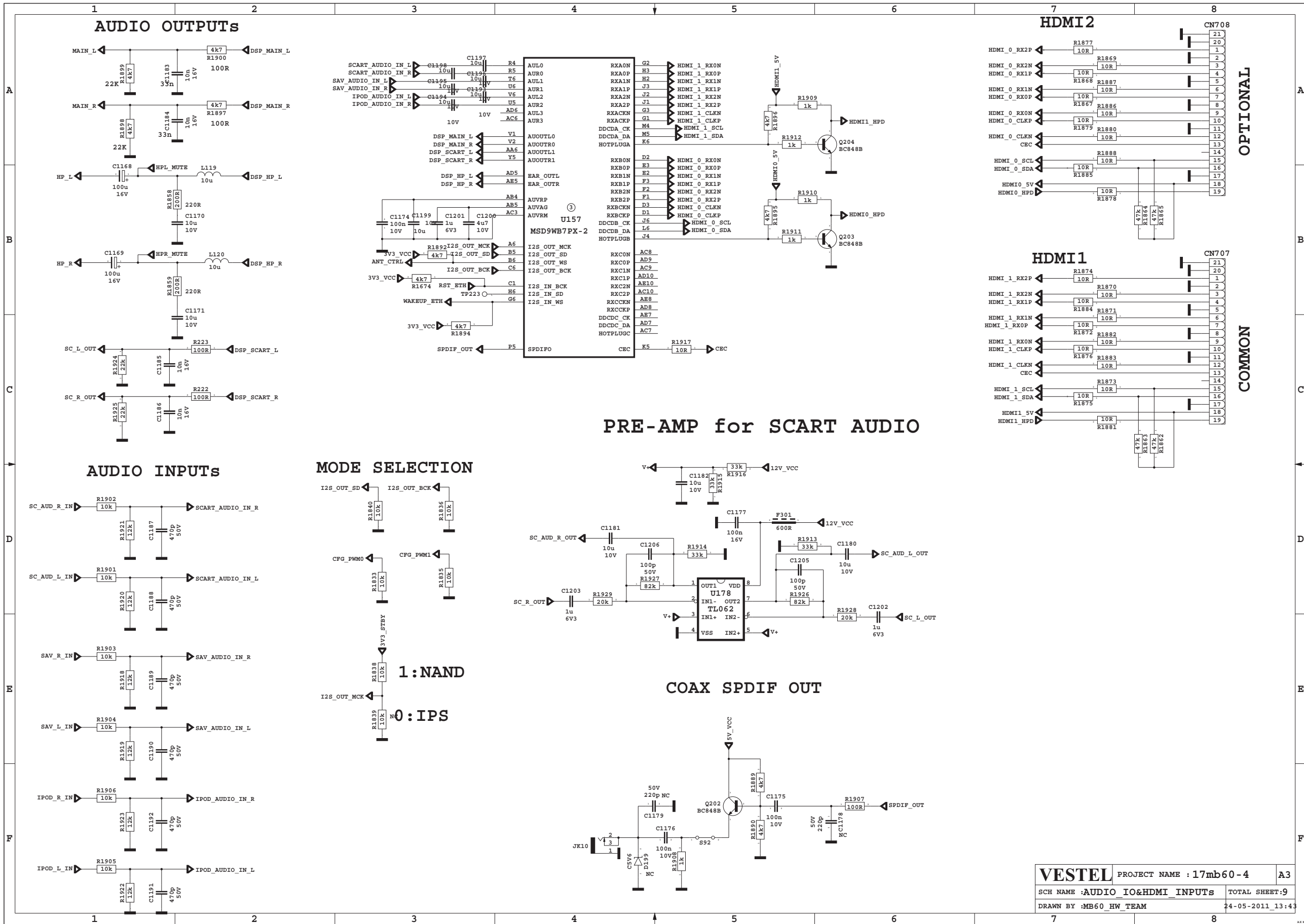
Peripherals Diagram



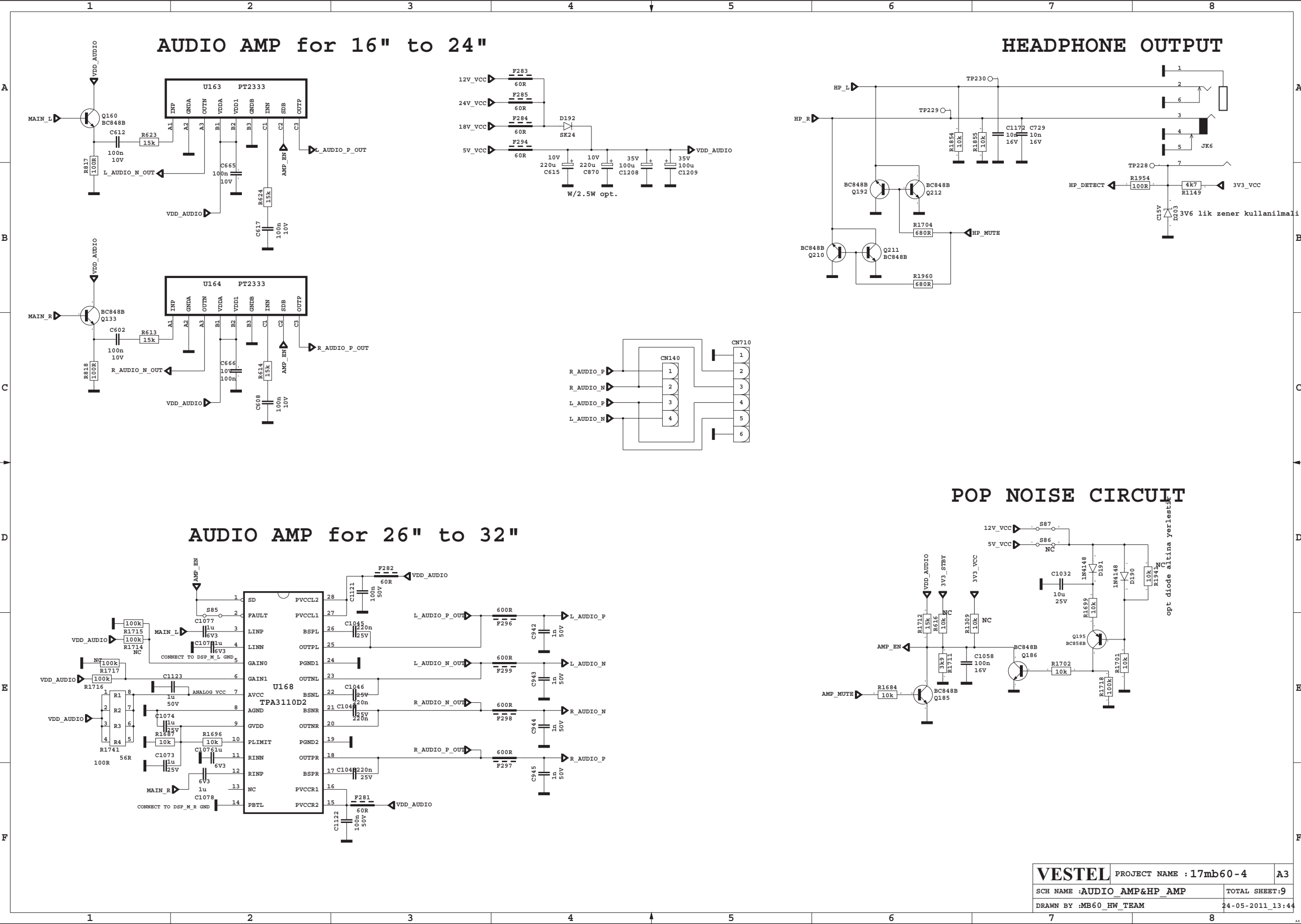
GPIOs & USB & LVDS Out Diagram



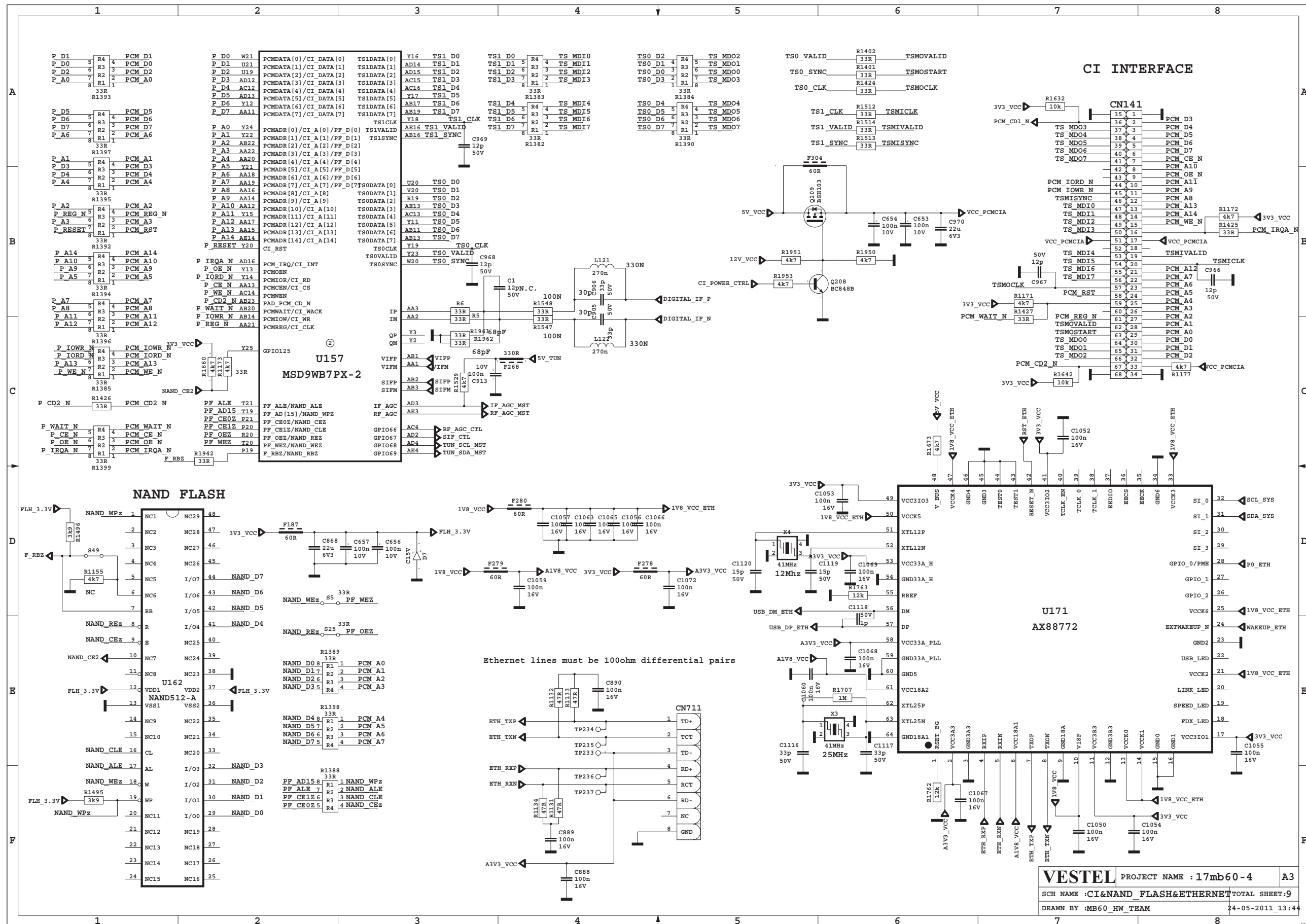
Audio IO & HDMI Inputs Diagram



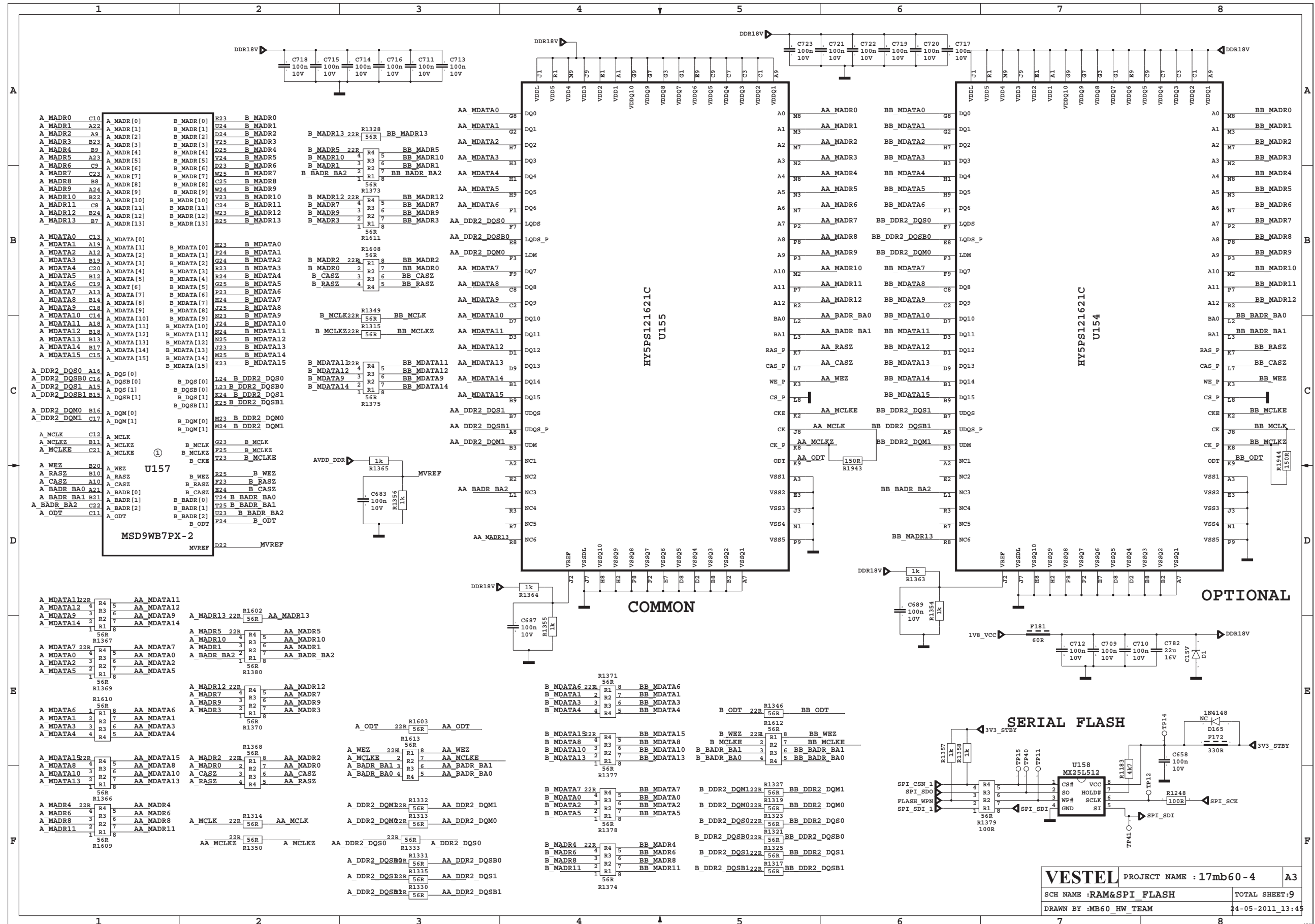
Audio AMP & HP AMP Diagram



CI & NAND FLASH & Ethernet Diagram

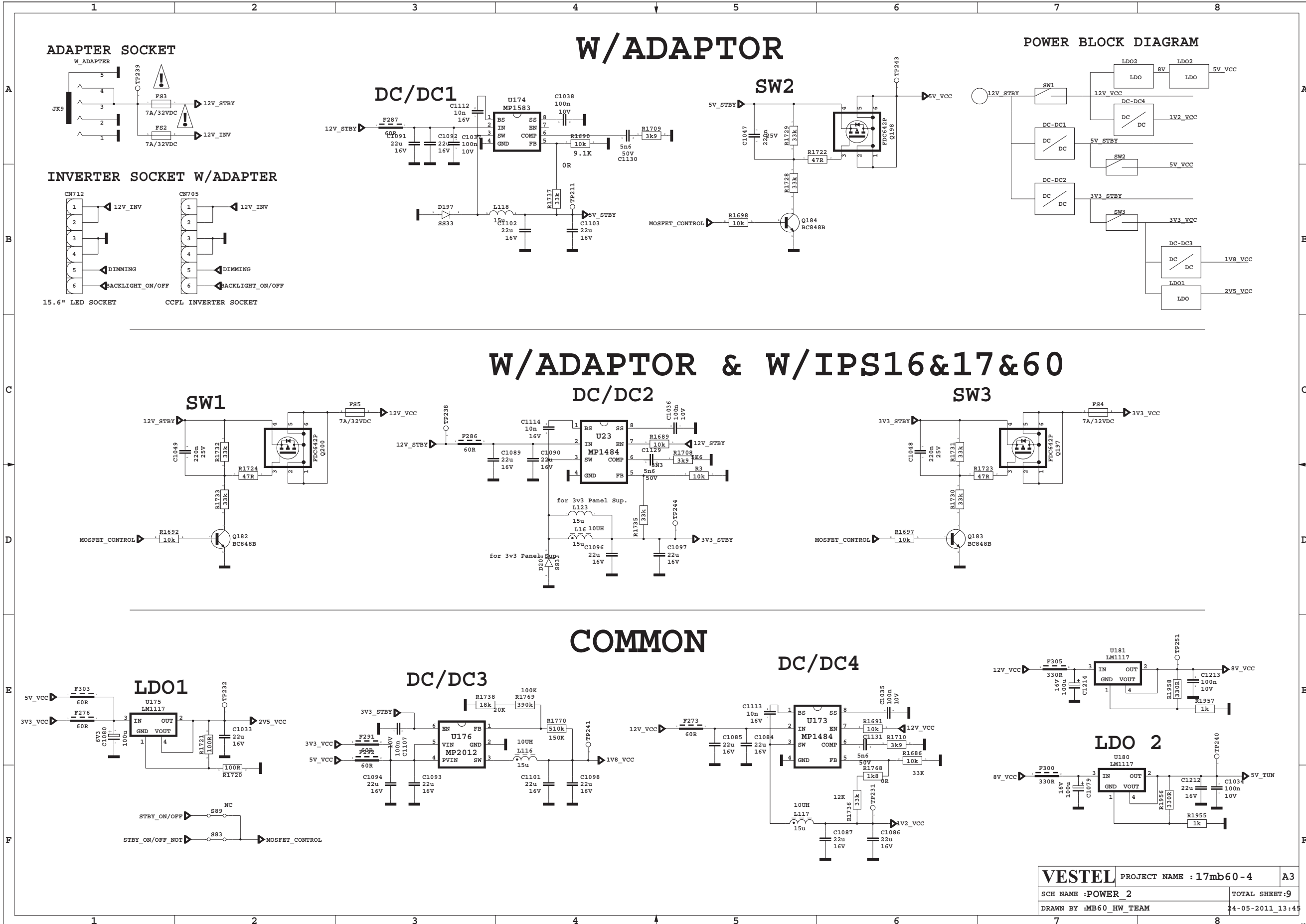


RAM & SPI FLASH & Diagram



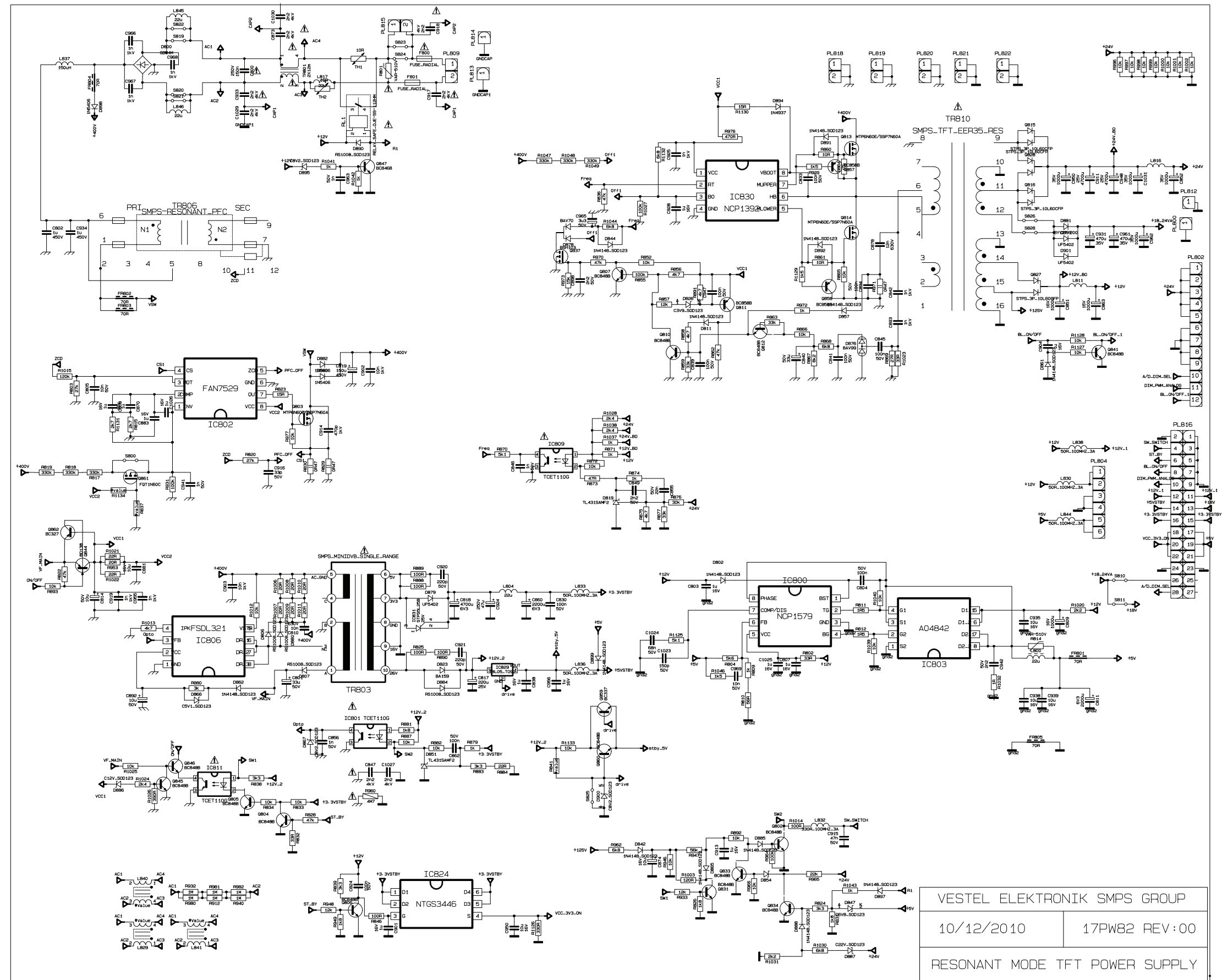


Main Power 2 / 2 Diagram



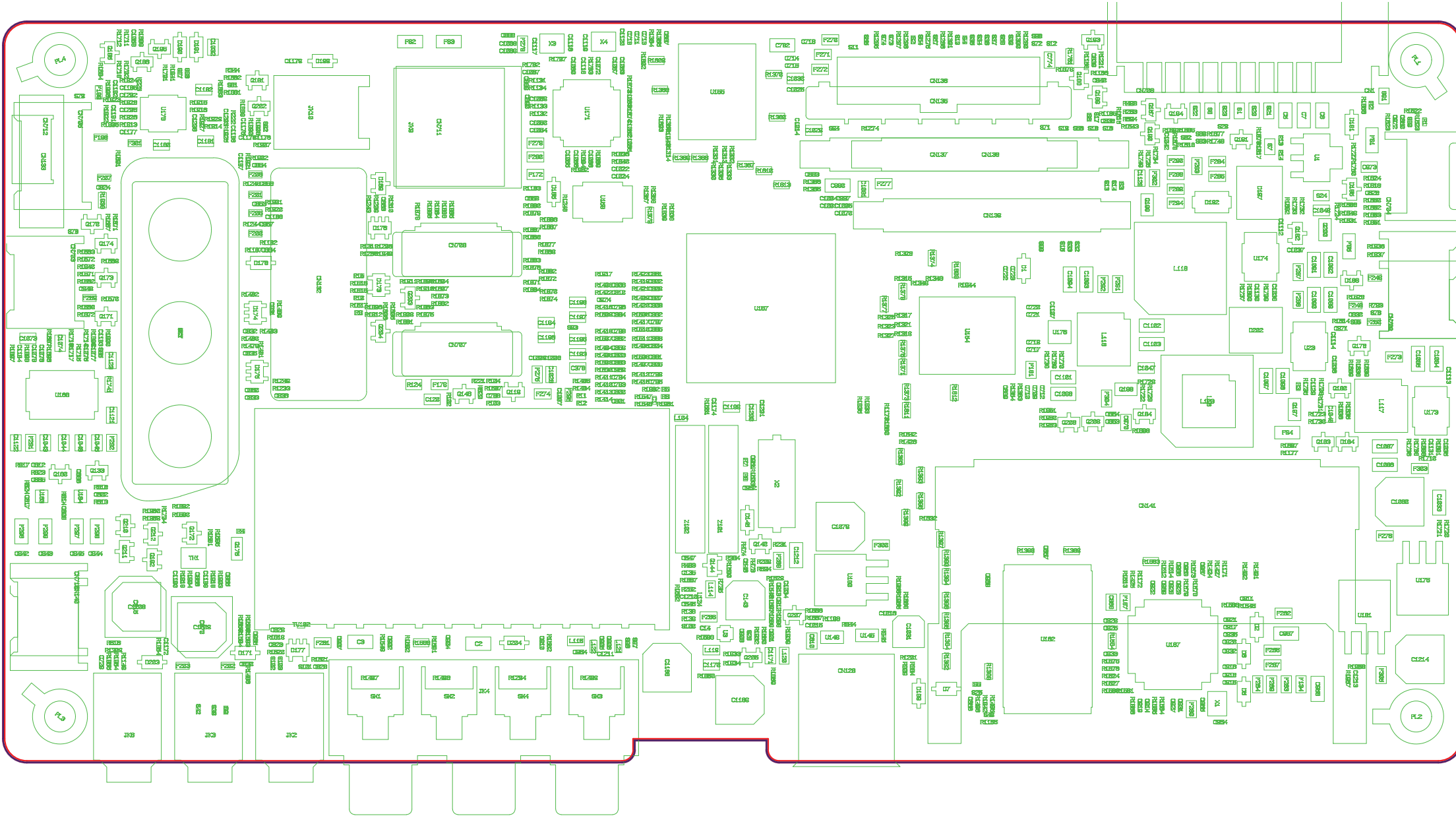
VESTEL	PROJECT NAME : 17mb60-4	A3
SCH NAME :POWER_2	TOTAL SHEET:9	
DRAWN BY :MB60_HW_TEAM	24-05-2011_13:45	

Power Supply (Resonant Mode TFT) Diagram



28. PRINTED WIRING BOARD

Main Unit PWB Top Side



Note:

PARTS LISTING

REPLACEMENT PARTS

Replacement parts which have special safety characteristics are identified in this manual.

Electrical components having such features are identified by  in the Replacement Parts Listing.

The use of a substitute replacement part which does not have the same safety characteristics as the factory recommended is not permitted.

Replacement parts not shown in this service manual may create shock fire, or other hazards.

HOW TO ORDER REPLACEMENT PARTS

To have your order completed promptly and correctly please supply the following information.

- | | | |
|-----------------|-------------|-------------|
| 1. MODEL NUMBER | 2. REF. NO. | 3. PART NO. |
| 4. DESCRIPTION | 5. CODE | 6. QUANTITY |

MARK *: SPARE PARTS DELIVERY SECTION (G: EPC GmbH)

REF No.	PARTS	DESCRIPTION	*	PRICE CODE
SH130E/SH340E LCD PANEL				
NOTE : THE PARTS HERE SHOWN ARE SUPPLIED AS AN ASSEMBLY BUT NOT INDEPENDENTLY				
	30067866	TFT LCD 32"W LG LC320WXN-SCB1 (PL)RoHS (SH130)	G	--
	30070517	TFT LCD 32FHD50HZ CCFL LG LC320WUN-SCB1(SH340)	G	--
PRINTED WIRING BOARDS				
	20562102	CHS.ASSY.17MB60-C4L1211H19232121A25 (32SH130E)	G	--
	20565091	CHS.ASSY.17MB60-C4L1211H12222121A25 (32SH130K)	G	--
	20561588	CHA.ASSY.17MB60-C4L1211H19232221A2B (32SH340E)	G	--
	20562152	MD.ASY.17W82 26"-32" 170-270V (ROC(SHARP) POWER	G	--
	20531132	MD.ASY.17LD98-7-1922880 (MB25(SHARP)	G	--
	20571818	MD.ASY.17TK129CY-2-26-42855/6/7(V4.0 SW)	G	--
MB60				
MAIN Unit				
INTEGRATED CIRCUITS				
U145	30062776	DIODE ESD AZ1045-04S SOT23-6 ROHS	G	--
U149	30062763	IC STMP52161 SOT23-5L ROHS	G	--
U155	30070284	IC DDR2 64Mx16 W971G66JB-18 BGA84 ROHS	G	--
U157	30068667	IC MSD9WB9PX-2-T1 DIVX BGA523 RoHS	G	--
U158	30067466	IC FLASH SPT 8Mb W25Q80BV S08 ROHS	G	--
U162	30069322	IC NAND 512Mb NAND512BW3D TSOP48 ROHS	G	--
U168	30068105	IC AAMP TPA3113 2x6W BTL TSSOP28 ROHS	G	--
U173	30070995	IC STEP DOWN RT8293A ADJ/3A S08 ROHS	G	--
U175	30060344	IC LDO LM1117 ADJ/1A DPAK ROHS	G	--
U176	30066926	IC STEP DOWN MP2012 ADJ/1.5A QFN6 RoHS	G	--
U178	30057644	IC DOPAMP TL062 S08 RoHS	G	--
U180	30060344	IC LDO LM1117 ADJ/1A DPAK ROHS	G	--
U181	30060344	IC LDO LM1117 ADJ/1A DPAK ROHS	G	--
U3	30060852	IC ANALOG 2:1SWITCH FSA3157 SC70 ROHS	G	--
TRANSISTORS				
Q119	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q140	30029775	TR NMOS BSN20 0.17A/50V SOT23 ROHS	G	--
Q144	30007800	TR NBJT BF799 0.35A/30V RF SOT23 RoHS	G	--
Q146	30001458	TR BC858B SMD	G	--
Q170	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q171	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q173	30001458	TR BC858B SMD	G	--

REF No.	PARTS	DESCRIPTION	*	PRICE CODE
Q174	30001458	TR BC858B SMD	G	--
Q178	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q180	30001458	TR BC858B SMD	G	--
Q181	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q185	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q186	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q188	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q189	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q190	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q191	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q192	30010733	TR NMOS 2N7002 0.1A/60V SOT23 ROHS	G	--
Q193	30001458	TR BC858B SMD	G	--
Q194	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q195	30001458	TR BC858B SMD	G	--
Q199	30018060	TR PMOS FDC642P -4A/-20V SSOT6 ROHS	G	--
Q202	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q203	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q204	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q205	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q207	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q208	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
Q209	30069749	TR NMOS BSH105 1.05A/30V SOT23 ROHS	G	--
Q210	30010733	TR NMOS 2N7002 0.1A/60V SOT23 ROHS	G	--
DIODES				
D145	30012411	DIODE SMD BA782 0.1A 35V SOD123 ROHS	G	--
D165	30042066	DIODE SMDSCHIN5819 1A/40V/25A SOD123ROHS	G	--
D169	30019996	DIODE BAV70 215mA/75V 4A SOT23 RoHS	G	--
D171	30038480	DIODE SMD ZEN C5.6V SOD123 ROHS	G	--
D173	30062776	DIODE ESD AZ1045-04S SOT23-6 ROHS	G	--
D174	30053657	DIODE ARRAY ESD NUP4004M5 TSOP-5 RoHS	G	--
D175	30053657	DIODE ARRAY ESD NUP4004M5 TSOP-5 RoHS	G	--
D176	30053657	DIODE ARRAY ESD NUP4004M5 TSOP-5 RoHS	G	--
D177	30053657	DIODE ARRAY ESD NUP4004M5 TSOP-5 RoHS	G	--
D178	30038478	DIODE SMD ZEN C15V SOD123 ROHS	G	--
D184	30048473	DIODE DUALSMD BAW56 4A/75V/4A SOT23ROHS	G	--
D185	30048473	DIODE DUALSMD BAW56 4A/75V/4A SOT23ROHS	G	--
D186	30048473	DIODE DUALSMD BAW56 4A/75V/4A SOT23ROHS	G	--
D189	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
D191	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
D192	30049510	FUSE SAFE SMD 3A 32V DC (1206) ROHS	G	--
D2	30038479	DIODE SMD ZEN C36V SOD123 ROHS	G	--
D203	30038480	DIODE SMD ZEN C5.6V SOD123 ROHS	G	--
D204	30038502	DIODE SMD ZEN B5.1V SOD123 ROHS	G	--
D7	30038479	DIODE SMD ZEN C36V SOD123 ROHS	G	--
PACKAGED CIRCUITS				
X2	30057263	XTAL 24MHz 22pF 30ppm 250hmHC49S SMDROHS	G	--
COILS AND FILTERS				
L104	30055201	COIL SMD 2.2uH 15mA J 1R15 603 Ro	G	--
L114	30016659	COIL SMD 1uH 50mA K OR4 805 Ro	G	--
L115	30068279	COIL SMD 120nH 0.4A J OR51 805 Ro	G	--
L116	30058702	COIL SMD 10uH 2.5A M OR4 7x7(SHL)Ro	G	--
L117	30058702	COIL SMD 10uH 2.5A M OR4 7x7(SHL)Ro	G	--
L119	30025158	COIL SMD 4.7uH 0.14A M OR4 805 Ro	G	--
L120	30025158	COIL SMD 4.7uH 0.14A M OR4 805 Ro	G	--
L124	30068280	COIL SMD 150nH 0.15A J 2R8 402 Ro	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	F179	30020394	FERRIT SMD 330/100MHz 0.1R M 1.5A 805Ro	G	--
	F181	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F187	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F200	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F201	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F202	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F203	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F205	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F206	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F248	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F249	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F259	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F261	30020394	FERRIT SMD 330/100MHz 0.1R M 1.5A 805Ro	G	--
	F266	30020394	FERRIT SMD 330/100MHz 0.1R M 1.5A 805Ro	G	--
	F268	30020394	FERRIT SMD 330/100MHz 0.1R M 1.5A 805Ro	G	--
	F270	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F271	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F272	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F273	30001734	RES SMD 1/10W OR 0805 ROHS	G	--
	F274	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F275	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F277	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F281	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F282	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F291	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F295	30024778	FERRIT SMD 60R/100MHz 0.1R M 0.5A 603Ro	G	--
	F296	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F297	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F298	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F299	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F300	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F301	30020530	FERRIT SMD 600R/100MHz 0.5R M 0.2A 603Ro	G	--
	F303	30019087	FERRIT SMD 60R/100MHz 0.025 M 3A 0805Roh	G	--
	F305	30001734	RES SMD 1/10W OR 0805 ROHS	G	--
TUNER					
	TU102	30069671	TUNER DIG. HALF-NIM DTOS403LH122E RoHS	G	--
CAPACITORS					
	C1004	30044848	CAP SMD 100NF 16V K X7R (0402) ROHS	G	--
	C1001	30044848	CAP SMD 100NF 16V K X7R (0402) ROHS	G	--
	C1004	30044848	CAP SMD 100NF 16V K X7R (0402) ROHS	G	--
	C1005	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1007	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1008	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1009	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1014	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1015	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C1016	30044848	CAP SMD 100NF 16V K X7R (0402) ROHS	G	--
	C1022	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1024	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1025	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1028	30046140	CAP SMD 10UF 6.3V M X5R (0805) ROHS	G	--
	C1029	30046140	CAP SMD 10UF 6.3V M X5R (0805) ROHS	G	--
	C1030	30046140	CAP SMD 10UF 6.3V M X5R (0805) ROHS	G	--
	C1031	30015406	CAP ELCH 22UF 16V M 30mA 4x5.4 ROHS	G	--
	C1032	30064117	CAP SMD 10UF 16V K X5R (0805) RoHS	G	--
	C1033	30069320	CAP SMD 22UF 6.3V M X7R (1206) RoHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	C1034	30044848	CAP SMD 100NF 16V K X7R (0402) ROHS	G	--
	C1035	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C1042	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C1043	30010560	CAP SMD 220NF 25V K X7R (0805) ROHS	G	--
	C1044	30010560	CAP SMD 220NF 25V K X7R (0805) ROHS	G	--
	C1045	30010560	CAP SMD 220NF 25V K X7R (0805) ROHS	G	--
	C1046	30010560	CAP SMD 220NF 25V K X7R (0805) ROHS	G	--
	C1058	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1070	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1073	30020142	CAP SMD 1UF 25V Z Y5V (0805) RoHS	G	--
	C1074	30020142	CAP SMD 1UF 25V Z Y5V (0805) RoHS	G	--
	C1075	30050557	CAP SMD 470NF 6.3V K X5R (0402) RoHS	G	--
	C1076	30050557	CAP SMD 470NF 6.3V K X5R (0402) RoHS	G	--
	C1077	30050557	CAP SMD 470NF 6.3V K X5R (0402) RoHS	G	--
	C1078	30050557	CAP SMD 470NF 6.3V K X5R (0402) RoHS	G	--
	C1079	30063686	CAP ELCH 100UF 16V M 105C 6.3x5.4 ROHS	G	--
	C1080	30063686	CAP ELCH 100UF 16V M 105C 6.3x5.4 ROHS	G	--
	C1081	30046140	CAP SMD 10UF 6.3V M X5R (0805) ROHS	G	--
	C1084	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C1085	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C1086	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C1087	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C1093	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C1094	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C1098	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C1101	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C1107	30050554	CAP SMD 1UF 6.3V M X5R (0402) RoHS	G	--
	C1113	30022342	CAP SMD 10NF 16V J X7R (0402) ROHS	G	--
	C1121	30067969	CAP SMD 10UF 16V K X7R (0805) ROHS	G	--
	C1122	30067969	CAP SMD 10UF 16V K X7R (0805) ROHS	G	--
	C1123	30067970	CAP SMD 1UF 50V K X5R (0805) ROHS	G	--
	C1131	30022339	CAP SMD 5.6NF 50V J X7R (0402) ROHS	G	--
	C1168	30010594	CAP ELCH 100UF 16V M 86mA 6.3x5.4 ROHS	G	--
	C1169	30010594	CAP ELCH 100UF 16V M 86mA 6.3x5.4 ROHS	G	--
	C1170	30067872	CAP SMD 10UF 10V M X5R (0805) ROHS	G	--
	C1171	30067872	CAP SMD 10UF 10V M X5R (0805) ROHS	G	--
	C1172	30022342	CAP SMD 10NF 16V J X7R (0402) ROHS	G	--
	C1174	30044848	CAP SMD 100NF 16V K X7R (0402) ROHS	G	--
	C1175	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C1176	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C1177	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
	C1178	30022236	CAP SMD 22PF 50V J COG (0402) ROHS	G	--
	C1179	30022236	CAP SMD 22PF 50V J COG (0402) ROHS	G	--
	C1180	30047296	CAP SMD 22UF 6.3V M X5R (0805) ROHS	G	--
	C1181	30047296	CAP SMD 22UF 6.3V M X5R (0805) ROHS	G	--
	C1182	30067872	CAP SMD 10UF 10V M X5R (0805) ROHS	G	--
	C1183	30022338	CAP SMD 4.7NF 50V J X7R (0402) RoHS	G	--
	C1184	30022338	CAP SMD 4.7NF 50V J X7R (0402) RoHS	G	--
	C1185	30022244	CAP SMD 100PF 50V J COG (0402) ROHS	G	--
	C1186	30022244	CAP SMD 100PF 50V J COG (0402) ROHS	G	--
	C1187	30022196	CAP SMD 470PF 50V J X7R (0402) ROHS	G	--
	C1188	30022196	CAP SMD 470PF 50V J X7R (0402) ROHS	G	--
	C1189	30022196	CAP SMD 470PF 50V J X7R (0402) ROHS	G	--
	C1190	30022196	CAP SMD 470PF 50V J X7R (0402) ROHS	G	--
	C1195	30067872	CAP SMD 10UF 10V M X5R (0805) ROHS	G	--
	C1196	30067872	CAP SMD 10UF 10V M X5R (0805) ROHS	G	--
	C1197	30067872	CAP SMD 10UF 10V M X5R (0805) ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	C1198	30067872	CAP SMD 10UF 10V M X5R (0805) ROHS	G	--
	C1199	30067968	CAP SMD 10UF 10V M X7R (0805) ROHS	G	--
	C120	30064117	CAP SMD 10UF 16V K X5R (0805) RoHS	G	--
	C1200	30066876	CAP SMD 4.7UF 10V K X7R (0805) ROHS	G	--
	C1201	30064783	CAP SMD 1UF 6.3V K X6S (0402) ROHS	G	--
	C1202	30050554	CAP SMD 1UF 6.3V M X5R (0402) RoHS	G	--
	C1203	30050554	CAP SMD 1UF 6.3V M X5R (0402) RoHS	G	--
	C1205	30022240	CAP SMD 47PF 50V J COG (0402) ROHS	G	--
	C1206	30022240	CAP SMD 47PF 50V J COG (0402) ROHS	G	--
	C1208	30067972	CAP ELCH 100UF 35V M105C120mA6.3x7.7RoHS	G	--
	C1209	30067972	CAP ELCH 100UF 35V M105C120mA6.3x7.7RoHS	G	--
	C1210	30061154	CAP SMD 82PF 50V J COG (0402) MXM ROHS	G	--
	C1212	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C1213	30044848	CAP SMD 100NF 16V K X7R (0402) ROHS	G	--
	C1214	30063686	CAP ELCH 100UF 16V M 105C 6.3x5.4 ROHS	G	--
	C135	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C14	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C143	30024769	CAP ELCH 47UF 16V M 52mA 5x5.4 ROHS	G	--
	C2	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C3	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C378	30067872	CAP SMD 10UF 10V M X5R (0805) ROHS	G	--
	C5	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C545	30022240	CAP SMD 47PF 50V J COG (0402) ROHS	G	--
	C546	30022342	CAP SMD 10NF 16V J X7R (0402) ROHS	G	--
	C547	30022342	CAP SMD 10NF 16V J X7R (0402) ROHS	G	--
	C6	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C610	30067872	CAP SMD 10UF 10V M X5R (0805) ROHS	G	--
	C630	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C653	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C654	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C656	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C657	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C658	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C663	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C664	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C683	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C687	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C7	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C709	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C710	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C711	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C712	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C713	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C714	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C715	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C716	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C718	30051167	CAP SMD 220NF 10V X7R K (0402) ROHS	G	--
	C729	30022342	CAP SMD 10NF 16V J X7R (0402) ROHS	G	--
	C782	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C794	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--
	C795	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C796	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--
	C797	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C798	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--
	C799	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C802	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C803	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	C804	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C805	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C806	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--
	C807	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C808	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C809	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C810	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--
	C823	30022237	CAP SMD 27PF 50V J COG (0402) ROHS	G	--
	C828	30022237	CAP SMD 27PF 50V J COG (0402) ROHS	G	--
	C829	30022237	CAP SMD 27PF 50V J COG (0402) ROHS	G	--
	C830	30022248	CAP SMD 220PF 50V J COG (0402) RoHS	G	--
	C831	30022248	CAP SMD 220PF 50V J COG (0402) RoHS	G	--
	C832	30022248	CAP SMD 220PF 50V J COG (0402) RoHS	G	--
	C833	30022248	CAP SMD 220PF 50V J COG (0402) RoHS	G	--
	C835	30022248	CAP SMD 220PF 50V J COG (0402) RoHS	G	--
	C836	30022248	CAP SMD 220PF 50V J COG (0402) RoHS	G	--
	C838	30022248	CAP SMD 220PF 50V J COG (0402) RoHS	G	--
	C839	30022248	CAP SMD 220PF 50V J COG (0402) RoHS	G	--
	C840	30022248	CAP SMD 220PF 50V J COG (0402) RoHS	G	--
	C853	30022336	CAP SMD 3.3NF 50V J X7R (0402) ROHS	G	--
	C854	30022336	CAP SMD 3.3NF 50V J X7R (0402) ROHS	G	--
	C855	30022336	CAP SMD 3.3NF 50V J X7R (0402) ROHS	G	--
	C856	30022336	CAP SMD 3.3NF 50V J X7R (0402) ROHS	G	--
	C857	30022338	CAP SMD 4.7NF 50V J X7R (0402) RoHS	G	--
	C858	30022338	CAP SMD 4.7NF 50V J X7R (0402) RoHS	G	--
	C859	30030099	CAP SMD 1NF 50V K X7R (0402) ROHS	G	--
	C860	30022240	CAP SMD 47PF 50V J COG (0402) ROHS	G	--
	C861	30030099	CAP SMD 1NF 50V K X7R (0402) ROHS	G	--
	C862	30030099	CAP SMD 1NF 50V K X7R (0402) ROHS	G	--
	C868	30047296	CAP SMD 22UF 6.3V M X5R (0805) ROHS	G	--
	C881	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C882	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--
	C883	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--
	C884	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--
	C885	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C886	30062359	CAP SMD 47NF 16V K X7R (0402) ROHS	G	--
	C901	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C902	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C903	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C904	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C905	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C906	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C907	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C910	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C912	30044848	CAP SMD 100NF 16V K X7R (0402) ROHS	G	--
	C913	30044848	CAP SMD 100NF 16V K X7R (0402) ROHS	G	--
	C942	30030099	CAP SMD 1NF 50V K X7R (0402) ROHS	G	--
	C943	30030099	CAP SMD 1NF 50V K X7R (0402) ROHS	G	--
	C944	30030099	CAP SMD 1NF 50V K X7R (0402) ROHS	G	--
	C945	30030099	CAP SMD 1NF 50V K X7R (0402) ROHS	G	--
	C949	30022237	CAP SMD 27PF 50V J COG (0402) ROHS	G	--
	C951	30022238	CAP SMD 33PF 50V J COG (0402) ROHS	G	--
	C952	30022238	CAP SMD 33PF 50V J COG (0402) ROHS	G	--
	C959	30022351	CAP SMD 47NF 16V J X5R (0402) ROHS	G	--
	C964	30022246	CAP SMD 150PF 50V J COG (0402) ROHS	G	--
	C967	30022167	CAP SMD 4.7PF 50V J COG (402) ROHS	G	--
	C968	30022165	CAP SMD 3.3PF 50V J COG (0402) RoHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	C970	30047296	CAP SMD 22UF 6.3V M X5R (0805) ROHS	G	--
	C971	30030097	CAP SMD 100NF 10V K X5R (0402) RoHS	G	--
	C974	30050554	CAP SMD 1UF 6.3V M X5R (0402) RoHS	G	--
	C990	30067595	CAP SMD 22UF 16V M X5R (1206) RoHS	G	--
	C997	30050558	CAP SMD 100NF 16V K X5R (0402) ROHS	G	--
RESISTORS					
	R10	30070980	FERRIT SMD 220R/100Mhz 0.35R M 0.3A 402R	G	--
	R102	30022098	RES SMD 1/16W 390R J 0402 RoHS	G	--
	R103	30022112	RES SMD 1/16W 68K J 0402 RoHS	G	--
	R104	30022084	RES SMD 1/16W 33K J 0402 RoHS	G	--
	R1149	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1158	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1165	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1166	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1171	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1172	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1173	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1177	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1182	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1183	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1187	30022057	RES SMD 1/16W 22K J 0402 RoHS	G	--
	R1198	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1201	30021958	RES SMD 1/16W 47K J 0402 RoHS	G	--
	R1206	30022051	RES SMD 1/16W 2.7K J 0402 ROHS	G	--
	R1209	30022051	RES SMD 1/16W 2.7K J 0402 ROHS	G	--
	R1221	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1233	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R124	30000588	RES SMD 1/10W 220R J 0805 ROHS	G	--
	R1243	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1244	30022020	RES SMD 1/16W 560R F 0402 RoHS	G	--
	R1245	30022020	RES SMD 1/16W 560R F 0402 RoHS	G	--
	R1248	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1249	30021960	RES SMD 1/16W 47R J 0402 ROHS	G	--
	R1265	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1309	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1310	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1311	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1313	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1314	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1330	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1331	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1332	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1333	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1335	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1350	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1355	30022041	RES SMD 1/16W 1K F 0402 ROHS	G	--
	R1356	30022041	RES SMD 1/16W 1K F 0402 ROHS	G	--
	R1357	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1358	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1364	30022041	RES SMD 1/16W 1K F 0402 ROHS	G	--
	R1365	30022041	RES SMD 1/16W 1K F 0402 ROHS	G	--
	R1366	30041373	RES NET 1/16W 22R J 8P 0402 ROHS	G	--
	R1367	30041373	RES NET 1/16W 22R J 8P 0402 ROHS	G	--
	R1368	30041373	RES NET 1/16W 22R J 8P 0402 ROHS	G	--
	R1369	30041373	RES NET 1/16W 22R J 8P 0402 ROHS	G	--
	R1370	30041373	RES NET 1/16W 22R J 8P 0402 ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	R1379	30038984	RES NET 1/32W 100R J 8P 0402 ROHS	G	--
	R138	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1380	30041373	RES NET 1/16W 22R J 8P 0402 ROHS	G	--
	R1382	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1383	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1384	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1385	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1388	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1389	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R139	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1390	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1392	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1393	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1394	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1395	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1396	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1397	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1398	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1399	30042505	RES NET 1/32W 33R J 8P 0402 ROHS	G	--
	R1401	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1402	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1405	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1406	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1407	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1408	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1409	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1411	30055434	RES SMD 1/16W 62R J 0402 ROHS	G	--
	R1412	30055434	RES SMD 1/16W 62R J 0402 ROHS	G	--
	R1415	30055434	RES SMD 1/16W 62R J 0402 ROHS	G	--
	R1416	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1417	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1418	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1419	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1420	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1421	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1422	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1423	30022003	RES SMD 1/16W 470R J 0402 ROHS	G	--
	R1424	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1425	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1426	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1427	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1479	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1480	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1481	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1482	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1483	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1486	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1489	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1494	30022003	RES SMD 1/16W 470R J 0402 ROHS	G	--
	R1495	30022078	RES SMD 1/16W 3.9K J 0402 RoHS	G	--
	R1496	30022078	RES SMD 1/16W 3.9K J 0402 RoHS	G	--
	R15	30070980	FERRIT SMD 220R/100Mhz 0.35R M 0.3A 402R	G	--
	R1505	30022003	RES SMD 1/16W 470R J 0402 ROHS	G	--
	R1506	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1507	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1508	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1509	30022132	RES SMD 1/16W OR 0402 ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	R1510	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1511	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1512	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1513	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1514	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1515	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1516	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1517	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1524	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1527	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1529	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1530	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1533	30022043	RES SMD 1/16W 1M J 0402 ROHS	G	--
	R1543	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1546	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1547	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1548	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1549	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1550	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1551	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1552	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1562	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1563	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1567	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1568	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1569	30022056	RES SMD 1/16W 220R J 0402 RoHS	G	--
	R1570	30022056	RES SMD 1/16W 220R J 0402 RoHS	G	--
	R1571	30022056	RES SMD 1/16W 220R J 0402 RoHS	G	--
	R1572	30022056	RES SMD 1/16W 220R J 0402 RoHS	G	--
	R1580	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1582	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1587	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1588	30038984	RES NET 1/32W 100R J 8P 0402 ROHS	G	--
	R1589	30022024	RES SMD 1/16W 12K J 0402 ROHS	G	--
	R1591	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1592	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1593	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1596	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1597	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1598	30022068	RES SMD 1/16W 6.8K F 0402 ROHS	G	--
	R1601	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1602	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1603	30022058	RES SMD 1/16W 22R J 0402 ROHS	G	--
	R1604	30022084	RES SMD 1/16W 33K J 0402 RoHS	G	--
	R1605	30022084	RES SMD 1/16W 33K J 0402 RoHS	G	--
	R1606	30022040	RES SMD 1/16W 18K J 0402 RoHS	G	--
	R1607	30022040	RES SMD 1/16W 18K J 0402 RoHS	G	--
	R1609	30041373	RES NET 1/16W 22R J 8P 0402 ROHS	G	--
	R1610	30041373	RES NET 1/16W 22R J 8P 0402 ROHS	G	--
	R1613	30041373	RES NET 1/16W 22R J 8P 0402 ROHS	G	--
	R1614	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1615	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1617	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1618	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1619	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1620	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--
	R1621	30022118	RES SMD 1/16W 75R J 0402 RoHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	R1632	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1635	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1636	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1638	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1639	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1642	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1660	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1661	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1662	30021977	RES SMD 1/16W 1.2K J 0402 RoHS	G	--
	R1663	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1666	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1667	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1668	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1671	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1672	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1676	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1677	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1678	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1679	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1684	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1685	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1686	30022099	RES SMD 1/16W 39K J 0402 ROHS	G	--
	R1687	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1691	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1693	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1696	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1699	30021989	RES SMD 1/16W 100K J 0402 ROHS	G	--
	R1701	30021989	RES SMD 1/16W 100K J 0402 ROHS	G	--
	R1702	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1704	30022088	RES SMD 1/16W 680R F 0402 ROHS	G	--
	R1710	30022078	RES SMD 1/16W 3.9K J 0402 RoHS	G	--
	R1715	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1716	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1718	30021989	RES SMD 1/16W 100K J 0402 ROHS	G	--
	R1720	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1721	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1725	30021960	RES SMD 1/16W 47R J 0402 ROHS	G	--
	R1727	30022084	RES SMD 1/16W 33K J 0402 RoHS	G	--
	R1736	30022140	RES SMD 1/16W 22K F (0402) RoHS	G	--
	R1738	30022053	RES SMD 1/16W 20K F 0402 ROHS	G	--
	R1741	30038984	RES NET 1/32W 100R J 8P 0402 ROHS	G	--
	R1748	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1750	30022057	RES SMD 1/16W 22K J 0402 RoHS	G	--
	R1761	30038984	RES NET 1/32W 100R J 8P 0402 ROHS	G	--
	R1768	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1769	30021989	RES SMD 1/16W 100K J 0402 ROHS	G	--
	R1770	30022026	RES SMD 1/16W 150K J 0402 RoHS	G	--
	R1833	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1835	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1836	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1838	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1840	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1854	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1855	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1857	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	R1858	30022056	RES SMD 1/16W 220R J 0402 RoHS	G	--
	R1859	30022056	RES SMD 1/16W 220R J 0402 RoHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	R1862	30021958	RES SMD 1/16W 47K J 0402 RoHS	G	--
	R1863	30021958	RES SMD 1/16W 47K J 0402 RoHS	G	--
	R1864	30021958	RES SMD 1/16W 47K J 0402 RoHS	G	--
	R1865	30021958	RES SMD 1/16W 47K J 0402 RoHS	G	--
	R1867	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1868	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1869	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1870	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1871	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1872	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1873	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1874	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1875	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1876	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1877	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1878	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1879	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1880	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1881	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1882	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1883	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1884	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1885	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1886	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1887	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1888	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R1889	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1890	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1895	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1896	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1897	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1898	30022055	RES SMD 1/16W 220K J 0402 ROHS	G	--
	R1899	30022055	RES SMD 1/16W 220K J 0402 ROHS	G	--
	R1900	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1901	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1902	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1903	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1904	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1907	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1908	30022056	RES SMD 1/16W 220R J 0402 RoHS	G	--
	R1909	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1910	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1911	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1912	30022042	RES SMD 1/16W 1K J 0402 RoHS	G	--
	R1913	30022084	RES SMD 1/16W 33K J 0402 RoHS	G	--
	R1914	30022084	RES SMD 1/16W 33K J 0402 RoHS	G	--
	R1915	30022055	RES SMD 1/16W 220K J 0402 ROHS	G	--
	R1916	30022055	RES SMD 1/16W 220K J 0402 ROHS	G	--
	R1918	30022024	RES SMD 1/16W 12K J 0402 ROHS	G	--
	R1919	30022024	RES SMD 1/16W 12K J 0402 ROHS	G	--
	R1920	30022024	RES SMD 1/16W 12K J 0402 ROHS	G	--
	R1921	30022024	RES SMD 1/16W 12K J 0402 ROHS	G	--
	R1924	30022140	RES SMD 1/16W 22K F (0402) RoHS	G	--
	R1925	30022140	RES SMD 1/16W 22K F (0402) RoHS	G	--
	R1926	30022122	RES SMD 1/16W 82K J 0402 ROHS	G	--
	R1927	30022122	RES SMD 1/16W 82K J 0402 ROHS	G	--
	R1928	30022054	RES SMD 1/16W 20K J 0402 ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	R1929	30022054	RES SMD 1/16W 20K J 0402 ROHS	G	--
	R1932	30021989	RES SMD 1/16W 100K J 0402 ROHS	G	--
	R1933	30021989	RES SMD 1/16W 100K J 0402 ROHS	G	--
	R1934	30021989	RES SMD 1/16W 100K J 0402 ROHS	G	--
	R1936	30021960	RES SMD 1/16W 47R J 0402 ROHS	G	--
	R1937	30021960	RES SMD 1/16W 47R J 0402 ROHS	G	--
	R1939	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1940	30022028	RES SMD 1/16W 150R J 0402 RoHS	G	--
	R1941	30022041	RES SMD 1/16W 1K F 0402 ROHS	G	--
	R1942	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	R1949	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1950	30021996	RES SMD 1/16W 10K J 0402 ROHS	G	--
	R1951	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1952	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1953	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1954	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R1955	30022041	RES SMD 1/16W 1K F 0402 ROHS	G	--
	R1956	30022083	RES SMD 1/16W 330R J 0402 ROHS	G	--
	R1957	30021977	RES SMD 1/16W 1.2K J 0402 RoHS	G	--
	R1958	30022056	RES SMD 1/16W 220R J 0402 RoHS	G	--
	R1959	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R1960	30022088	RES SMD 1/16W 680R F 0402 ROHS	G	--
	R1961	30022240	CAP SMD 47PF 50V J COG (0402) ROHS	G	--
	R1962	30022240	CAP SMD 47PF 50V J COG (0402) ROHS	G	--
	R209	30021989	RES SMD 1/16W 100K J 0402 ROHS	G	--
	R221	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R222	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R223	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R231	30022051	RES SMD 1/16W 2.7K J 0402 ROHS	G	--
	R252	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R344	30021977	RES SMD 1/16W 1.2K J 0402 RoHS	G	--
	R384	30021999	RES SMD 1/16W 10R J 0402 RoHS	G	--
	R473	30022068	RES SMD 1/16W 6.8K F 0402 ROHS	G	--
	R474	30022068	RES SMD 1/16W 6.8K F 0402 ROHS	G	--
	R483	30021977	RES SMD 1/16W 1.2K J 0402 RoHS	G	--
	R5	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R594	30022057	RES SMD 1/16W 22K J 0402 RoHS	G	--
	R6	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R620	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R7	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R735	30022088	RES SMD 1/16W 680R F 0402 ROHS	G	--
	R793	30021960	RES SMD 1/16W 47R J 0402 ROHS	G	--
	R8	30021991	RES SMD 1/16W 100R J 0402 ROHS	G	--
	R809	30021987	RES SMD 1/16W 4.7K J 0402 RoHS	G	--
	R844	30021990	RES SMD 1/16W 4.7R J 0402 ROHS	G	--
	R845	30021990	RES SMD 1/16W 4.7R J 0402 ROHS	G	--
	R884	30021989	RES SMD 1/16W 100K J 0402 ROHS	G	--
	R9	30070980	FERRIT SMD 220R/100Mhz 0.35R M 0.3A 402R	G	--
MISCELLANEOUS PARTS					
	CN1	30067935	CONN HEADER 2X14P 2.54 W/LOCK SIDE RoHS	G	--
	CN128	30044670	SOCKET USB SIDE RoHS	G	--
	CN132	30059740	SOCKET D-SUB 15P TOP 11.9MM RoHS	G	--
	CN141	30067876	SOCKET PCMCIA 5.DECK 4mm HEADERonly RoHS	G	--
	CN703	30063090	CONN HEADER 5P 2.0MM SIDE W/LOCK RoHS	G	--
	CN707	30066018	SOCKET HDMI 19P 0.5MM TOP ROHS	G	--
	CN708	30066018	SOCKET HDMI 19P 0.5MM TOP ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	CN709	30066919	CONN HEADER 6P 2.0MM SIDE W/LOCK RoHS	G	--
	CN710	30066919	CONN HEADER 6P 2.0MM SIDE W/LOCK RoHS	G	--
	JK10	30066835	JACK RCA 1P BLACK TOP RoHS	G	--
	JK2	30067217	JACK HEADPHONE GREEN 3 POLE SIDE ROHS	G	--
	JK4	30062840	JACK RCA 3P RED/WH/YELLOW SIDE SLIM ROHS	G	--
	JK6	30067506	JACK HEADPHONE BLACK 3 POLE SIDE ROHS	G	--
	PL1	35028044	GROUND_TERMINAL_MAIN_BOARD_4.2mm	G	--
	PL2	35028044	GROUND_TERMINAL_MAIN_BOARD_4.2mm	G	--
	PL3	35028044	GROUND_TERMINAL_MAIN_BOARD_4.2mm	G	--
	PL4	35028044	GROUND_TERMINAL_MAIN_BOARD_4.2mm	G	--
	S101	30063648	FERRIT SMD 120/100MHz 0.09R M1.2A 0402Ro	G	--
	S102	30063648	FERRIT SMD 120/100MHz 0.09R M1.2A 0402Ro	G	--
	S103	30063648	FERRIT SMD 120/100MHz 0.09R M1.2A 0402Ro	G	--
	S22	30001734	RES SMD 1/10W OR 0805 ROHS	G	--
	S23	30001734	RES SMD 1/10W OR 0805 ROHS	G	--
	S25	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	S39	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	S42	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	S49	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	S5	30022085	RES SMD 1/16W 33R J 0402 RoHS	G	--
	S7	30001734	RES SMD 1/10W OR 0805 ROHS	G	--
	S76	30063648	FERRIT SMD 120/100MHz 0.09R M1.2A 0402Ro	G	--
	S83	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	S85	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	S86	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	S9	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	S92	30022056	RES SMD 1/16W 220R J 0402 RoHS	G	--
	S93	30022132	RES SMD 1/16W OR 0402 ROHS	G	--
	SC1	30070522	SOCKET SCART 21P TOP LEFT BLACK PIP ROHS	G	--
	Z101	30012545	FILTER SAW K9656M ROHS	G	--
	Z102	30001692	FILTER SAW OFWK3953MROHS	G	--
17PW82 POWER SUPPLY					
			INTEGRATED CIRCUITS	G	--
	IC800	30067808	IC PWM CONT NCP1579 S08 ROHS	G	--
⚠	IC801	30015087	IC SAFE OPTOCOUPLER TCET1102G	G	--
	IC802	30068428	IC PFC NCP1608 S08 ROHS	G	--
	IC803	30066849	TR DN MOS FDS8984 7A/30V S08 RoHS	G	--
	IC806	30070626	IC SMPS FSL206MR 67KHz DIP8 ROHS	G	--
⚠	IC809	30015087	IC SAFE OPTOCOUPLER TCET1102G	G	--
⚠	IC811	30015087	IC SAFE OPTOCOUPLER TCET1102G	G	--
	IC824	30033743	TR NMOS NT6S3446 5.1A/20V TSOP6 RoHS	G	--
	IC830	30067806	IC PWM HALFBRIDGE DRIVER NCP1392 S08 RoH	G	--
	IC831	30051690	DIODE SMD FVD05045 5A/40V 75A DPAK RoHS	G	--
TRANSISTORS					
	Q802	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q803	30039463	TR NMOS FQPF9N50C 9A/500V TO220F ROHS.	G	--
	Q804	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q805	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q806	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q807	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q810	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q811	30001458	TR BC858B SMD	G	--
	Q812	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	Q813	30060725	TR NMOS STP9NK50ZFP 7.2A/500V TO220FROHS	G	--
	Q814	30060725	TR NMOS STP9NK50ZFP 7.2A/500V TO220FROHS	G	--
	Q827	20349668	HE ASY.17IP502-2-SMPS 20/100V DIODE	G	--
	Q827	30048782	DIODE SCH STPS20H100CFP20A/100V TO220ROH	G	--
	Q828	30048782	DIODE SCH STPS20H100CFP20A/100V TO220ROH	G	--
	Q831	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q833	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q834	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q837	30029322	TR NMOS FDV303N 0.68A/25V SOT23 ROHS	G	--
	Q841	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q844	30013531	TR PBJT BD140 -1.5A/-80V SOT32 ROHS	G	--
	Q845	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q846	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q857	30001458	TR BC858B SMD	G	--
	Q858	30001458	TR BC858B SMD	G	--
	Q860	30001457	TR NBJT BC848B 0.1A/30V SOT23 ROHS	G	--
	Q861	30068728	TR NMOS FQTIN60C 0.2A/600V SOT223 ROHS	G	--
DIODES					
	D800	30064312	DIODE BRI 6BU4M 4A/1000V 150A LCD ROHS	G	--
	D802	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
	D806	30059220	DIODE SMD RS1008FL 0.5A/800V SOD123FL RO	G	--
	D807	30057252	DIODE SMD RS1002FL 0.5A/200V SOD123FL RO	G	--
	D811	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
	D819	30008996	IC VREF TL431SAMF2 ADJ %1 SOT23 ROHS	G	--
	D823	30001318	DIODE BA159 1A/800V 20A	G	--
	D826	30038481	DIODE SMD ZEN C6.8V SOD123 ROHS	G	--
	D842	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
	D844	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
	D847	30038481	DIODE SMD ZEN C6.8V SOD123 ROHS	G	--
	D851	30008996	IC VREF TL431SAMF2 ADJ %1 SOT23 ROHS	G	--
	D854	30038498	DIODE SMD ZEN C18V SOD123 ROHS	G	--
	D857	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
	D861	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
	D862	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
	D867	30038477	DIODE SMD ZEN C8.2V SOD123 ROHS	G	--
	D876	30007169	DIODE DUALBAV99 0.215A/70V 4.5ASOT23ROHS	G	--
	D878	30019996	DIODE BAV70 215mA/75V 4A SOT23 RoHS	G	--
	D880	30059220	DIODE SMD RS1008FL 0.5A/800V SOD123FL RO	G	--
	D882	30014352	DIODE MUR460 4A/600V DO-27 ROHS	G	--
	D883	30014352	DIODE MUR460 4A/600V DO-27 ROHS	G	--
	D885	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
	D886	30038476	DIODE SMD ZEN C12V SOD123 ROHS	G	--
	D887	30038495	DIODE SMD ZEN C22V SOD123 ROHS	G	--
	D888	30038507	DIODE SMD 1N4148 0.15A/100V SOD123 RoHS	G	--
	D894	30001291	DIODE HER107 1A/800V 30A DO41 ROHS	G	--
	D898	30014352	DIODE MUR460 4A/600V DO-27 ROHS	G	--
	D900	30038480	DIODE SMD ZEN C5.6V SOD123 ROHS	G	--
COILS AND FILTERS					
	L800	30059889	Choke coil Toroid 22uH 3A M 18x9.5 Ro	G	--
	L804	30065734	Choke Coil 1uH 5A M 0.7R 8x7 Ro	G	--
	L811	30018122	CHOKE COIL 1.0UH 20A M 0.4R 15X10 RO	G	--
	L816	30018122	CHOKE COIL 1.0UH 20A M 0.4R 15X10 RO	G	--
	L830	30024779	FERRIT SMD 50R/100MHZ 0.4R M 3A 1206 ROH	G	--
	L832	30020394	FERRIT SMD 330/100MHz 0.1R M 1.5A 805Ro	G	--
	L833	30024779	FERRIT SMD 50R/100MHZ 0.4R M 3A 1206 ROH	G	--
	L836	30024779	FERRIT SMD 50R/100MHZ 0.4R M 3A 1206 ROH	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	L837	30002012	Choke Coil 150uH 3A K 12.5x15 RoHS	G	--
	L838	30028331	FUSE SAFE SMD 7A/32VDC 1206 RoHS	G	--
△	L840	30061594	Line Filter Safe 2x16mH%50 2A ET24 RoHS	G	--
	L844	30024779	FERRIT SMD 50R/100MHZ 0.4R M 3A 1206 ROH	G	--
△	L845	20434318	CN.ASY.Ferrite Bead(FTZ) 20uH 1A+MAKARON	G	--
△	L846	20434318	CN.ASY.Ferrite Bead(FTZ) 20uH 1A+MAKARON	G	--
	FR801	30006712	FERRIT BEAD AXI 70/100M 3A 3.5x4.7Roh	G	--
	FR802	30006712	FERRIT BEAD AXI 70/100M 3A 3.5x4.7Roh	G	--
	FR804	30006712	FERRIT BEAD AXI 70/100M 3A 3.5x4.7Roh	G	--
	FR805	30006712	FERRIT BEAD AXI 70/100M 3A 3.5x4.7Roh	G	--
CAPACITORS					
	C1023	30000224	CAP SMD 220PF 50V J COG (0805) ROHS	G	--
	C1024	30000341	CAP SMD 68NF 50V K X7R (0805) ROHS	G	--
	C1025	30015459	CAP SMD 470NF 25V K X7R (0805) RoHS	G	--
△	C1027	30056342	CAP CER SAFE 3.3NF 4KV M 3.5MM SHARP RoH	G	--
△	C1029				
△	C1030	30069939	CAP CER SAFE 330PF 4KV M 3.5MMSHAROHS	G	--
	C1032	30061026	CAP SMD 1UF 25V K X7R (0805) ROHS	G	--
	C1033	30061026	CAP SMD 1UF 25V K X7R (0805) ROHS	G	--
	C1034	30061026	CAP SMD 1UF 25V K X7R (0805) ROHS	G	--
	C1035	30061026	CAP SMD 1UF 25V K X7R (0805) ROHS	G	--
△	C1036	30069939	CAP CER SAFE 330PF 4KV M 3.5MMSHAROHS	G	--
△	C1037	30056342	CAP CER SAFE 3.3NF 4KV M 3.5MM SHARP RoH	G	--
△	C800	30007858	CAP MKTSAFE 470NF 275V M A 225BOXTOS/USA	G	--
	C801	30044218	CAP EL 33UF 50V M 105 ROHS	G	--
△	C802	30039383	CAP MKT SAFE 1UF 450V K 15DIP RoHS	G	--
	C803	30015459	CAP SMD 470NF 25V K X7R (0805) RoHS	G	--
	C804	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
	C805	30000284	CAP SMD 1NF 50V K X7R (0805) ROHS	G	--
	C807	30015459	CAP SMD 470NF 25V K X7R (0805) RoHS	G	--
	C810	30056344	CAP MKP 10NF 630Vdc/622Vpp J 15BOX ROHS	G	--
	C811	30071174	CAPEL 1000UF 25V M 105C1540mA 10X20SHARO	G	--
	C814	30070588	CAP EL 47UF 35V M 105C 86mA 8x7SHARPROHS	G	--
	C817	30028464	CAP EL 220UF 25V M 105C LOW ESR 8X16 ROH	G	--
	C818	30062016	CAP EL 2700UF 16V M 105°2400mA 13x20ROHS	G	--
	C819	30070766	CAPEL 150UF 450V M 105C 1100mA 25x25SHAR	G	--
	C824	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
	C830	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
	C833	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
	C838	30046152	CAP SMD 1UF 50V Z Y5V (0805) ROHS	G	--
	C839	30000256	CAP SMD 470PF 50V J COG (0805) ROHS	G	--
	C840	30044218	CAP EL 33UF 50V M 105 ROHS	G	--
	C841	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
	C842	30039384	CAP SMD 1NF 1KV K X7R (1206) ROHS	G	--
	C845	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
△	C847	30069936	CAP CER SAFE 150PF 4KV M 3.5MMSHAROHS	G	--
	C849	30000309	CAP SMD 2.2NF 50V K X7R (0805) ROHS	G	--
	C850	30071175	CAPEL 1000UF 50V M 105C1900mA 12.5X25SHA	G	--
	C851	30071174	CAPEL 1000UF 25V M 105C1540mA 10X20SHARO	G	--
	C852	30071175	CAPEL 1000UF 50V M 105C1900mA 12.5X25SHA	G	--
	C855	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
	C856	30000312	CAP SMD 22NF 50V K X7R (0805) ROHS	G	--
	C860	30056144	CAP EL 2200UF 6.3V M 105°750mA 10x20ROHS	G	--
	C862	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
	C863	30071174	CAPEL 1000UF 25V M 105C1540mA 10X20SHARO	G	--
	C870	30061026	CAP SMD 1UF 25V K X7R (0805) ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
△	C873	30069938	CAP CER SAFE 1NF 4KV M 3.5MMSHAROHS	G	--
	C874	30070588	CAP EL 47UF 35V M 105C 86mA 8x7SHARPROHS	G	--
	C878	30061879	CAPMKP 22NF 630Vdc/622Vpp J15BOXRoHS	G	--
	C881	30065572	CAP SMD 10UF 25V K X7R (1206) ROHS	G	--
	C883	30000284	CAP SMD 1NF 50V K X7R (0805) ROHS	G	--
	C892	30034074	CAP EL 100UF 25V M 105°135mA 6.3x11 ROHS	G	--
	C893	30039384	CAP SMD 1NF 1KV K X7R (1206) ROHS	G	--
	C898	30000309	CAP SMD 2.2NF 50V K X7R (0805) ROHS	G	--
	C901	30059259	CAP SMD 2.2UF 25V K X7R (0805) ROHS	G	--
	C904	30000341	CAP SMD 68NF 50V K X7R (0805) ROHS	G	--
	C913	30061026	CAP SMD 1UF 25V K X7R (0805) ROHS	G	--
	C914	30066377	CAP CER 220PF 1KV K YRN 125C(PULSE) ROHS	G	--
	C915	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
	C916	30000263	CAP SMD 56PF 50V J COG (0805) ROHS	G	--
△	C917	30069936	CAP CER SAFE 150PF 4KV M 3.5MMSHAROHS	G	--
△	C918	30069936	CAP CER SAFE 150PF 4KV M 3.5MMSHAROHS	G	--
	C920	30000340	CAP SMD 6.8NF 50V K X7R (0805) ROHS	G	--
	C925	30065572	CAP SMD 10UF 25V K X7R (1206) ROHS	G	--
	C928	30000309	CAP SMD 2.2NF 50V K X7R (0805) ROHS	G	--
△	C933	30056342	CAP CER SAFE 3.3NF 4KV M 3.5MM SHARP RoH	G	--
	C935	30052271	CAP SMD 10UF 25V K X5R (1206) ROHS	G	--
	C938	30052271	CAP SMD 10UF 25V K X5R (1206) ROHS	G	--
	C939	30052271	CAP SMD 10UF 25V K X5R (1206) ROHS	G	--
	C942	30000284	CAP SMD 1NF 50V K X7R (0805) ROHS	G	--
	C947	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
	C948	30071175	CAPEL 1000UF 50V M 105C1900mA 12.5X25SHA	G	--
	C950	30052271	CAP SMD 10UF 25V K X5R (1206) ROHS	G	--
	C955	30052271	CAP SMD 10UF 25V K X5R (1206) ROHS	G	--
	C956	30046152	CAP SMD 1UF 50V Z Y5V (0805) ROHS	G	--
	C966	30000444	CAP CER 470PF 1KV K Y5P ROHS	G	--
	C967	30000444	CAP CER 470PF 1KV K Y5P ROHS	G	--
	C968	30000444	CAP CER 470PF 1KV K Y5P ROHS	G	--
	C969	30000294	CAP SMD 100NF 50V K X7R (0805) ROHS	G	--
RESISTORS					
	R1000	30000818	RES SMD 1/10W 8.2K J 0805 ROHS	G	--
	R1001	30000818	RES SMD 1/10W 8.2K J 0805 ROHS	G	--
	R1002	30000818	RES SMD 1/10W 8.2K J 0805 ROHS	G	--
	R1003	30000494	RES SMD 1/10W 120R J 0805 ROHS	G	--
	R1006	30060652	RES SMD 1/4W 100K J (1206) RoHS	G	--
	R1007	30060652	RES SMD 1/4W 100K J (1206) RoHS	G	--
	R1010	30060652	RES SMD 1/4W 100K J (1206) RoHS	G	--
	R1011	30060652	RES SMD 1/4W 100K J (1206) RoHS	G	--
	R1012	30000469	RES SMD 1/10W 1K J 0805 ROHS	G	--
	R1013	30001734	RES SMD 1/10W OR 0805 ROHS	G	--
	R1014	30000464	RES SMD 1/10W 100R J 0805 ROHS	G	--
	R1020	30001735	RES SMD 1/8W OR 1206 ROHS	G	--
	R1022	30006462	RES SMD 1/10W 22R J 0805 ROHS	G	--
	R1023	30000710	RES SMD 1/10W 47R J 0805 ROHS	G	--
	R1024	30000529	RES SMD 1/10W 15K J 0805 ROHS	G	--
	R1025	30025823	RES SMD 1/10W 15K F 0805 ROHS	G	--
	R1026	30000688	RES SMD 1/10W 390R J 0805 ROHS	G	--
	R1027	30064582	RES SMD 1/8W 18K F 0805 ROHS	G	--
	R1030	30012355	RES SMD 1/10W 6.8K F 0805 RoHS	G	--
	R1031	30000593	RES SMD 1/10W 2.2K J 0805 ROHS	G	--
	R1032	30000609	RES SMD 1/10W 2.2R J 0805 ROHS	G	--
	R1037	30007021	RES SMD 1/10W 1K F 0805 ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	R1038	30000614	RES SMD 1/10W 2.4K J 0805 RoHS	G	--
	R1039	30064582	RES SMD 1/8W 18K F 0805 ROHS	G	--
	R1040	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R1044	30007791	RES SMD 1/10W 4.7K F (0805) ROHS	G	--
	R1046	30000593	RES SMD 1/10W 2.2K J 0805 ROHS	G	--
	R1047	30050064	RES SMD 1/4W 1.62M F 1206 ROHS	G	--
	R1048	30050064	RES SMD 1/4W 1.62M F 1206 ROHS	G	--
	R1049	30050064	RES SMD 1/4W 1.62M F 1206 ROHS	G	--
	R1125	30007026	RES SMD 1/10W 5.1K J 0805 ROHS	G	--
	R1126	30000524	RES SMD 1/10W 150R J 0805 ROHS	G	--
	R1127	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R1128	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R1129	30000494	RES SMD 1/10W 120R J 0805 ROHS	G	--
	R1130	30000517	RES SMD 1/10W 15R J 0805 ROHS	G	--
	R1133	30001734	RES SMD 1/10W OR 0805 ROHS	G	--
	R1134	30007789	RES SMD 1/10W 27K F 0805 ROHS	G	--
	R1136	30000606	RES SMD 1/10W 2.2M J (0805) RoHS	G	--
	R1137	30000524	RES SMD 1/10W 150R J 0805 ROHS	G	--
	R1138	30000524	RES SMD 1/10W 150R J 0805 ROHS	G	--
	R1139	30000524	RES SMD 1/10W 150R J 0805 ROHS	G	--
⚠	R801	30018085	CAP VAR SAFE 510V K MFCN14D511 ROHS	G	--
	R802	30000653	RES SMD 1/10W 33R J 0805 ROHS	G	--
	R804	30000751	RES SMD 1/10W 5.6K J 0805 ROHS	G	--
	R809	30007021	RES SMD 1/10W 1K F 0805 ROHS	G	--
	R810	30000653	RES SMD 1/10W 33R J 0805 ROHS	G	--
	R811	30000609	RES SMD 1/10W 2.2R J 0805 ROHS	G	--
	R812	30000609	RES SMD 1/10W 2.2R J 0805 ROHS	G	--
	R815	30000668	RES SMD 1/10W 33K J 0805 ROHS	G	--
	R817	30039196	RES SMD 1/4W 1M F 1206 ROHS	G	--
	R818	30050064	RES SMD 1/4W 1.62M F 1206 ROHS	G	--
	R819	30050064	RES SMD 1/4W 1.62M F 1206 ROHS	G	--
	R820	30000597	RES SMD 1/10W 22K J 0805 ROHS	G	--
	R822	30000727	RES SMD 1/10W 47K J 0805 ROHS	G	--
	R823	30000517	RES SMD 1/10W 15R J 0805 ROHS	G	--
	R824	30000727	RES SMD 1/10W 47K J 0805 ROHS	G	--
	R826	30000563	RES SMD 1/10W 1.8K J 0805 ROHS	G	--
	R828	30000727	RES SMD 1/10W 47K J 0805 ROHS	G	--
	R829	30006765	RES MO 2W 0.22R J TAPED RoHS	G	--
	R831	30000563	RES SMD 1/10W 1.8K J 0805 ROHS	G	--
	R832	30000668	RES SMD 1/10W 33K J 0805 ROHS	G	--
	R833	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R834	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R836	30064313	RES SMD 1/10W 12K F (0805) ROHS	G	--
	R837	30000755	RES SMD 1/10W 56K J 0805 ROHS	G	--
	R838	30000593	RES SMD 1/10W 2.2K J 0805 ROHS	G	--
	R839	30000664	RES SMD 1/10W 3.3K J 0805 ROHS	G	--
	R841	30000631	RES SMD 1/10W 2.7K J 0805 ROHS	G	--
	R846	30000464	RES SMD 1/10W 100R J 0805 ROHS	G	--
	R852	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R855	30000480	RES SMD 1/10W 100K J 0805 ROHS	G	--
	R856	30000721	RES SMD 1/10W 4.7K J 0805 ROHS	G	--
	R857	30000503	RES SMD 1/10W 12K J 0805 ROHS	G	--
	R858	30000721	RES SMD 1/10W 4.7K J 0805 ROHS	G	--
	R859	30000668	RES SMD 1/10W 33K J 0805 ROHS	G	--
	R860	30000710	RES SMD 1/10W 47R J 0805 ROHS	G	--
	R861	30000710	RES SMD 1/10W 47R J 0805 ROHS	G	--
	R862	30000727	RES SMD 1/10W 47K J 0805 ROHS	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	R863	30000668	RES SMD 1/10W 33K J 0805 ROHS	G	--
	R864	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R865	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R866	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R867	30025823	RES SMD 1/10W 15K F 0805 ROHS	G	--
	R868	30025823	RES SMD 1/10W 15K F 0805 ROHS	G	--
	R869	30000469	RES SMD 1/10W 1K J 0805 ROHS	G	--
	R870	30007026	RES SMD 1/10W 5.1K J 0805 ROHS	G	--
	R872	30000664	RES SMD 1/10W 3.3K J 0805 ROHS	G	--
	R873	30000464	RES SMD 1/10W 100R J 0805 ROHS	G	--
	R874	30007021	RES SMD 1/10W 1K F 0805 ROHS	G	--
	R875	30012852	RES SMD 1/10W 3.9K F 0805 ROHS	G	--
	R876	30058193	RES SMD 1/8W 30K F 0805 ROHS	G	--
	R877	30007789	RES SMD 1/10W 27K F 0805 ROHS	G	--
	R879	30015227	RES SMD 1/10W 1.2K F 0805 RoHS	G	--
	R881	30000814	RES SMD 1/10W 820R J 0805 ROHS	G	--
	R882	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R883	30000664	RES SMD 1/10W 3.3K J 0805 ROHS	G	--
	R884	30010641	RES SMD 1/10W 27R J 0805 ROHS	G	--
	R887	30015227	RES SMD 1/10W 1.2K F 0805 RoHS	G	--
	R888	30000735	RES SMD 1/10W 4.7R J 0805 ROHS	G	--
	R889	30000735	RES SMD 1/10W 4.7R J 0805 ROHS	G	--
	R891	30000721	RES SMD 1/10W 4.7K J 0805 ROHS	G	--
	R892	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R893	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R912	30039196	RES SMD 1/4W 1M F 1206 ROHS	G	--
	R929	30000494	RES SMD 1/10W 120R J 0805 ROHS	G	--
	R931	30007789	RES SMD 1/10W 27K F 0805 ROHS	G	--
	R932	30039196	RES SMD 1/4W 1M F 1206 ROHS	G	--
	R933	30000503	RES SMD 1/10W 12K J 0805 ROHS	G	--
	R940	30050066	RES SMD 1/4W 649K F 1206 ROHS	G	--
	R946	30000567	RES SMD 1/10W 18K J 0805 ROHS	G	--
	R947	30000782	RES SMD 1/10W 68K J (0805) ROHS	G	--
	R948	30000727	RES SMD 1/10W 47K J 0805 ROHS	G	--
	R949	30000668	RES SMD 1/10W 33K J 0805 ROHS	G	--
⚠	R960	30070785	RES MG SAFE 1/2W 7.8M J NEW ROHS	G	--
	R962	30000751	RES SMD 1/10W 5.6K J 0805 ROHS	G	--
	R964	30000480	RES SMD 1/10W 100K J 0805 ROHS	G	--
	R965	30000751	RES SMD 1/10W 5.6K J 0805 ROHS	G	--
	R966	30007021	RES SMD 1/10W 1K F 0805 ROHS	G	--
	R970	30000727	RES SMD 1/10W 47K J 0805 ROHS	G	--
	R971	30006765	RES MO 2W 0.22R J TAPED RoHS	G	--
	R972	30000588	RES SMD 1/10W 220R J 0805 ROHS	G	--
	R973	30025823	RES SMD 1/10W 15K F 0805 ROHS	G	--
	R976	30000653	RES SMD 1/10W 33R J 0805 ROHS	G	--
	R977	30000475	RES SMD 1/10W 10K J 0805 ROHS	G	--
	R980	30039196	RES SMD 1/4W 1M F 1206 ROHS	G	--
	R981	30050066	RES SMD 1/4W 649K F 1206 ROHS	G	--
	R982	30050066	RES SMD 1/4W 649K F 1206 ROHS	G	--
	R996	30000818	RES SMD 1/10W 8.2K J 0805 ROHS	G	--
	R997	30000818	RES SMD 1/10W 8.2K J 0805 ROHS	G	--
	R998	30000818	RES SMD 1/10W 8.2K J 0805 ROHS	G	--
	R999	30000818	RES SMD 1/10W 8.2K J 0805 ROHS	G	--
MISCELLANEOUS PARTS					
	J109	30002583	KISA DEVRE TELİ 0.6MM	G	--
	J110	30002583	KISA DEVRE TELİ 0.6MM	G	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	J111	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J112	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J113	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J114	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J115	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J116	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J117	30001735	RES SMD 1/8W OR 1206 ROHS	6	--
	J118	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J119	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J121	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J122	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J123	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J124	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J125	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J126	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J127	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J129	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J130	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J131	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J132	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J133	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J134	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J135	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J136	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J137	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J139	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J140	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J141	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J145	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J147	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J148	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J149	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J150	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J151	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J152	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J153	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J155	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J156	30001734	RES SMD 1/10W OR 0805 ROHS	6	--
	J158	30001735	RES SMD 1/8W OR 1206 ROHS	6	--
	J159	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J160	30001734	RES SMD 1/10W OR 0805 ROHS	6	--
	J161	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J162	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J164	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J167	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J168	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J169	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J170	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J171	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J172	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J173	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J174	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J100	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J101	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J102	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J105	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J106	30002583	KISA DEVRE TELİ 0.6MM	6	--

	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
	J107	30002583	KISA DEVRE TELİ 0.6MM	6	--
	J108	30002583	KISA DEVRE TELİ 0.6MM	6	--
⚠	F800	30028356	FUSE SAFE 3.15A 250V (RADIAL) ROHS	6	--
⚠	F801	30028356	FUSE SAFE 3.15A 250V (RADIAL) ROHS	6	--
	PL800	35016591	GROUND TERMINAL 3.5MM ROHS	6	--
	PL802	30029522	CONN HEADER 12P 2.5MM TOP BLK RoHS	6	--
	PL804	30032635	CONN HEADER 6P 2.5MM TOP WHT SD ROHS	6	--
⚠	PL809	30031046	CONN HEADER SAFE 2P(V0)7.5MM TOP WHT TOS	6	--
	PL813	35016591	GROUND TERMINAL 3.5MM ROHS	6	--
	PL814	35016591	GROUND TERMINAL 3.5MM ROHS	6	--
⚠	PL815	30062820	CONN HEADER SAFE 2P V0 7.5MM TOP BLK TOS	6	--
	PL816	30061705	CONN HEADER 2x14P 2.5mm W/LOCK ROHS	6	--
	TH1	30001265	RES THE SAFE 10R/3A NTC SCK-103 RoHS	6	--
	TH2	30001265	RES THE SAFE 10R/3A NTC SCK-103 RoHS	6	--
⚠	TR803	30054292	TRF SMT SAFE 5t-By 26''/52'' EF25 22mmRo	6	--
⚠	TR806	30060103	TRF PFC SAFE26/32/42''EER3019N250μHK21Ro	6	--
⚠	TR810	30067289	TRF SMT SAFE EER35 32''Res.32mm Rohs	6	--
		20397357	HE.ASY.17PW26-SMPS26''-32''20A/100V DIODES	6	--
		20397368	HE.ASY.17PW26-PFC-SMPS HALFBRIDGE	6	--
		30002170	Ferrite Bead(FTZ) RADIAL 14x8x8 RoHS	6	--
		30071506	PCB 17PW82-2,V1(ROHS)-SAFE/CTI600	6	--
		35017056	SCREW S C ZN YSMB 2,9*7,5 W-R RoHS	6	--
		35017056	SCREW S C ZN YSMB 2,9*7,5 W-R RoHS	6	--
		35017056	SCREW S C ZN YSMB 2,9*7,5 W-R RoHS	6	--
		35022376	HEATSINK L TYPE 21,5*48,5*2	6	--
		35024501	HEATSINK_L_TYPE_97_37,5_25_3(17 PW26)	6	--
		35024502	HEATSINK L TYPE_111_12,5_25_3 (17 PW26)	6	--
		40008113	ISITLA DARALAN MAKARON) RoHS	6	--

CABINET AND MECHANICAL PARTS LISTING					
	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
		20497779	FRONT 32883W/TB(B.C.BL/P-V(SHARP/S)(VO) CABINET	G	--
		20562253	BC.32883 WO/BP&KL&CH(I)VO (SHARP) BACK OVER	G	--
		40042934	LENS.COSM.LCD32883(SKR)-SILV-SILK PRINT	G	--
		40043425	LED IR LENS TFT XX856 (% MILKY) VER7.	G	--
		30069262	CNAS 8P-6/900 CY W/DC+FER UL1571#28RoHS	G	--
⚠		20577382	ROC.SE.AS.(32883 MB60_SHARP) Rocker Switch cable	G	--
		20562171	FOOT ASSY 32942(GLOSSY-BLACK_SHARP(PKG)	G	--
		45010585	DETACHABLE SHARP ST.BLACK LCD32 LED PKG	G	--
		20566747	SPK.AS.32883 (MB60 (30X107(BL)_SHARP SPEAKERS	G	--
		40045319	BLACKET IO 17MB35 VER112 (I (VO_SHARP))	G	--
		20579065	CN.A.FFC 30P/400 LVDS FI-X(32L6SCBSHARP) (32SH130)	G	--
		30069818	CNAS 12-14P/300 SISW/DCINV UL1007#24 (32SH130)	G	--
		30065285	CNAS51P-50/300 10BFHD UL20276#30 LVDS (32SH340)	G	--
		30069817	CNAS 12P+14P/400 SISW/DCUL1007 INVT (32SH340)	G	--
ACCESSORIES PARTS LISTING					
	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
⚠		30054983	PWR CORD SAFE EU 1800-380MM W/F+GR+H ROH (SH130E/SH340E)	G	--
⚠		30055588	PWR CORD SAFE UK 1800-380MM W/F+GR+H ROH (SH130K)	G	--
		20559144	ARTWORK SHARP LC-32SH340E	G	--
		20562101	R/C 1910 SHARP-1910 (GRAYS/S) REMOTE CONTROLLER	G	--
		20559138	ARTWORK SHARP LC-32SH130E	G	--
		20563282	ARTWORK SHARP LC-32SH130K	G	--
PACKING PARTS LISTING					
	REF No.	PARTS	DESCRIPTION	*	PRICE CODE
		20562169	SNOW BOX ASSY (T/B)32883	G	--
		50185332	CARTON BOX SHARP LC-32SH340E	G	--
		50185319	CARTON BOX SHARP LC-32SH130E	G	--
		50186862	CARTON BOX SHARP LC-32SH130K	G	--



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